Northeastern University

Catalogs of

College of Liberal Arts

College of Business Administration

College of Engineering

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School of Business

Evening Courses
of the College of Liberal Arts
and
Lincoln Institute

★

Graduate Programs

College of Engineering
School of Business
College of Education

NORTHEASTERN UNIVERSITY

COLLEGES OF

Education
Liberal Arts
Business Administration
Engineering

1954–1955

(COEDUCATIONAL)

BOSTON 15, MASSACHUSETTS

January, 1954

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Central Quadrangle, Huntington Avenue

NORTHEASTERN UNIVERSITY

DAY COLLEGES

General Information

1954–1955

(COEDUCATIONAL)

BOSTON 15, MASSACHUSETTS
January, 1954

NORTHEASTERN UNIVERSITY

Day Colleges

COLLEGE OF EDUCATION
COLLEGE OF LIBERAL ARTS
COLLEGE OF BUSINESS ADMINISTRATION
COLLEGE OF ENGINEERING

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Freshman Academic Calendar

SEPTEMBER, 1954 TO SEPTEMBER, 1955

1954

SEPTEMBER 8 *Wednesday:* Registration and opening of college year for Division S Freshman Class.   Students failing to register promptly on this date will be charged a late registration fee of five dollars ($5.00).

OCTOBER 12 *Tuesday:* Columbus Day, college exercises omitted.

NOVEMBER 11 *Thursday:* Armistice Day, college exercises omitted.

NOVEMBER 17 *Wednesday:* Registration and opening of college year for Division N Freshman Class.   Students failing to register promptly on this date will be charged a late registration fee of five dollars ($5.00).

NOVEMBER 20 *Saturday:* End of first term for Division S Freshmen.

NOVEMBER 22 *Monday:* Second term begins for Division S Freshmen.

NOVEMBER 25 *Thursday:* Thanksgiving Day, college exercises omitted.

DECEMBER 22 *Wednesday:* Classes for all students will end at 5:00 p.m. and reconvene on Monday, December 27, 1954, at 9:00 a.m.

1955

JANUARY 1 *Saturday:* New Year's Day, college exercises omitted.

JANUARY 29 *Saturday:* End of second term for Division S Freshmen and end of first term for Division N Freshmen.

JANUARY 31 *Monday:* Third term begins for Division S Freshmen and second term begins for Division N Freshmen.

FEBRUARY 18 *Friday:* Classes for all students will end at 5:00 p.m. and reconvene on Wednesday, February 23, 1955, at 9:00 a.m.

APRIL 9 *Saturday:* End of third term and college year for Division S Freshmen and end of the second term for Division N Freshmen.

APRIL 11 *Monday:* Beginning of five-week summer term (term 4) for Division S Freshmen. Summer term may be taken at this time or at the period beginning August 8, 1955. Third term begins for Division N Freshmen.

APRIL 19 *Tuesday:* Patriot's Day, college exercises omitted.

MAY 14 *Saturday:* First five-week summer term for Division S Freshmen closes.

MAY 16 *Monday:* Beginning of summer term vacation period for Division S Freshmen.   (For those students who have completed term 4.)

MAY 30 *Monday:* Memorial Day, college exercises omitted.

JUNE 18 *Saturday:* End of third term and college year for Division N Freshmen.

JUNE 20 *Monday:* Beginning of the first optional five-week summer term (term 4) for Division N students.

JULY 4 *Monday:* Independence Day, college exercises omitted.

JULY 23 *Saturday:* Optional five-week summer term (term 4) for Division N Freshmen closes.

JULY 25 *Monday:* Beginning of summer term vacation period for Division N Freshmen (who have completed term 4).

AUGUST 8 *Monday:* Beginning of five-week summer term period for those students in Division S and Division N who did not attend in the first summer term periods.

SEPTEMBER 10 *Saturday:* Second five-week summer term closes.

SEPTEMBER 12 *Monday:* Registration and opening of college for the academic year 1955–56.

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Roger Preston
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Term Expires in 1955

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General Statement

NORTHEASTERN UNIVERSITY is incorporated as a philanthropic institution under the General Laws of Massachusetts. The State Legislature, by special enactment, has given the University general degree granting powers.

The Corporation of Northeastern University consists of men who occupy responsible positions in business and the professions. This Corporation elects from its membership a Board of Trustees in whom the control of the institution is vested. The Board of Trustees has four standing committees: (a) an Executive Committee which has general supervision of the financial and educational policies of the University; (b) a Committee on Buildings which has general supervision over the building needs of the University; (c) a Committee on Funds and Investments which has the responsibility of administering the funds of the University; (d) a Committee on Development which is concerned with furthering the development plans of the University.

Founded in 1898, Northeastern University, from its beginning, has had as its dominant purpose the discovery of human and social needs and the meeting of these needs in distinctive and highly serviceable ways. While subscribing to the most progressive educational thought and practice, the University has not duplicated the programs of other institutions but has sought "to bring education more directly into the service of human needs."

The following is a brief outline of the principal types of educational opportunities offered by the University.

In the Field of Liberal Arts

The College of Liberal Arts offers majors in the usual fields of the arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. With the exception of pre-professional programs, day curricula are normally five years in length and operated on the Co-operative Plan. However, in all majors except Chemistry and Physics, qualified students, with the approval of the Dean, may elect to complete the requirements for the degree on a full-time plan in four years.

The College of Liberal Arts offers certain of its courses during evening hours, constituting a program of three years' duration equivalent in hours to one-half the requirements for the A.B. or S.B. degree. The degree of Associate in Arts is conferred upon those who complete this program. A complete A.B. program is also offered in the evening division with curricula in Economics, History and Government, and Sociology.

In the Field of Education

The College of Education offers four-year curricula leading to the degree of Bachelor of Science in Education. These are designed particularly to meet the needs of high school graduates who desire to prepare themselves for teaching and administrative positions in elementary and secondary schools.

During late afternoons, evenings, and Saturday mornings, the College of Education also sponsors graduate courses for teachers in service and leading to the degree of Master of Education.

In the Field of Business

The College of Business Administration offers five-year co-operative curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management leading to the degree of Bachelor of Science in Business Administration. Four-year conventional programs not involving co-operative work, leading to the same degree are also available for veterans.

The School of Business — operated during evening hours — offers undergraduate curricula leading to the degree of Bachelor of Business Administration in Accounting, Management, Law and Business, Engineering and Management, Liberal Arts and Business. For students who because of occupational reasons desire shorter programs concentrating in specific areas, Institutes awarding the certificate are offered in Credit and Financial Management, Insurance, Labor Relations, Municipal Management, Office Management, Production Management, Quality Control, Real Estate, Retailing, Taxes, Traffic and Transportation, World Trade, and for Business and Professional Secretaries.

The Graduate Division of the School of Business provides an evening program of graduate study leading to the degree of Master of Business Administration.

In the Field of Engineering

The College of Engineering offers five-year co-operative curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering leading to the degree of Bachelor of Science with specification according to the department in which the student qualifies.

The College of Engineering also offers during evening hours graduate programs of instruction leading to the degree of Master of Science in certain fields in Civil, Mechanical and Electrical Engineering, in Mathematics-Physics, and in Chemistry. These curricula are designed to provide engineering graduates opportunities for further professional development.

The Lincoln Technical Institute offers during evening hours programs leading to the degrees of Associate in Chemistry and Associate in Engineering in Civil, Mechanical, Electrical, Electronic, and Industrial Engineering.

Buildings and Facilities

University Buildings

Location

Northeastern University is located on Huntington Avenue, Boston, at the entrance to the Huntington Avenue Subway and opposite the historic Boston Opera House. The main administrative offices of the University, including those of the College of Education, are located in Richards Hall.

The chief railroad centers of Boston are the North and South Stations. To reach the University from the North Station, board a car going to Park Street, at which junction transfer to any Huntington Avenue car. To reach the University from the South Station, board a Cambridge subway train for Park Street Under. There go up one flight of stairs and board any Huntington Avenue car, alighting at the "Northeastern" Station which is the first stop outside the subway.

Huntington Avenue Campus

The principal educational buildings of Northeastern University are located on a sixteen-acre site in the Back Bay Section of Boston. They have been erected in accordance with a long-range development plan for meeting the University's needs; the largest units are interconnected by means of tunnels so that students can go from building to building without going out of doors in inclement weather.

Student Activities

Northeastern University regards student activities as an integral part of its educational program. One of the main departments of the University, the Student Activities Department, is charged with the responsibility of co-ordinating the various types of activities and of administering the social, musical, literary, and athletic organizations in such a way as to enable each to contribute in a wholesome, worthwhile manner to student life at Northeastern. Every student is encouraged to participate in such activities as may appeal to him.

Members of the faculty also are interested in extracurricular activities. A faculty adviser is appointed for each student organization. His function is to encourage the students in the development of their programs, and to give them the benefit of his experience and mature point of view in integrating these programs with other important phases of college life.

One of the outstanding contributions of the Co-operative Plan in the field of higher education has been its capacity to develop in students those powers of social understanding that are so essential to success in professional life. At Northeastern the program of student activities is made to contribute to this end in a very real way. It is a conscious aim of the student activities advisers to develop among their advisees those qualities of personality and character which will enhance their usefulness as future professional men and citizens. Students have splendid opportunities to develop administrative and executive ability as leaders of undergraduate organizations. No academic credit is awarded for any student activity. This has been no deterrent, however, to student participation in extracurricular activities, for a substantial majority of the undergraduate body participate annually in one or more forms of student activity.

Athletics

The University maintains both varsity and freshman teams in baseball, basketball, cross-country, football, hockey, and track. Games and meets are arranged with many eastern colleges. In addition to intercollegiate competition, a program of intramural sports is carried out under the supervision of the Department of Student Activities.

Athletic policies for the University are determined by the Faculty Committee on Student Activities. This committee determines the eligibility of students to participate in athletics, approves the various sports schedules, and approves awards of letters and numerals to qualified athletes.

Honor Societies

Five honorary societies are chartered in the Day Colleges:
Tau Beta Pi, in the College of Engineering (Massachusetts Epsilon Chapter).

Eta Kappa Nu, in the Department of Electrical Engineering (Gamma Beta Chapter).

Pi Tau Sigma, in the Department of Mechanical Engineering (Northeastern Tau Kappa Chapter).

The Sigma Society, in the College of Business Administration.

The Academy, in the College of Liberal Arts.

Election to the college honorary societies is based primarily upon scholarship, but before a man or woman is privileged to wear the honorary society insignia there must be evidence of an integrity of character and an interest in the extra-curricular life of the University as well as an acceptable personality. The societies have memberships consisting of the outstanding men and women in the Day Colleges. Election to an honorary society is the highest honor that can be conferred upon an undergraduate.

Publications

"*The News*" — A college newspaper, the *Northeastern News*, is published each week throughout the college year by a staff selected from the student body. The copy is prepared, edited, and published by the students themselves with the counsel of a faculty adviser. Opportunity is afforded for the students to express their opinions on subjects relating to study, co-operative work, social events, or topics of the day. Positions on the *News* staff and promotions are attained by competitive work. The paper is in part supported by advertising, both national and local, and in part by a portion of the student activities fees. The *Northeastern News* is a member of the Eastern Intercollegiate Newspaper Association, and sends one of its editors to the annual convention of this association each year. Copies of the *News* are mailed to upperclassmen when they are at co-operative work and to freshmen after the close of their college year.

"*The Cauldron*" — The combined senior class publishes annually a college yearbook, *The Cauldron*. It is ready for distribution in the latter part of the second term and contains a complete review of the college year with class histories, pictures of all seniors, of the faculty, and of undergraduate groups, as well as a miscellany of snapshots and drawings contributed by students.

Student Council

Student government of the Day Colleges at Northeastern University is vested in the Student Council, composed of elected representatives from the various classes. The Council is the authority on all matters relating to student policies not definitely connected with classroom procedure. It has jurisdiction, subject to faculty approval, over all such matters as customs, privileges, and campus regulations.

Student Union

The purpose of the Northeastern Student Union is to deepen the spiritual lives of Northeastern men and women through the building of character, to create and promote a strong and effective Northeastern University spirit in and through a unified student body, to promote sociability, and to emphasize certain ethical, social, civic, intellectual and avocational values.

All students are encouraged to participate in the activities of the Union, no matter what their religious faith, as the work of the Union is entirely nonsectarian.

The Union conducts a weekly chapel service in the Bacon Memorial Chapel in

the Student Center Building, to which all faculty members and students are invited. The service, which is nonsectarian and voluntary, is held on Wednesdays from 1:15 to 1:45 o'clock. Many eminent preachers of Greater Boston are engaged to deliver brief addresses.

Professional Societies and Clubs

To assist in the promotion of social, cultural, and intellectual advancement through informal channels, a number of professional societies and clubs are sponsored.

Accounting Society — All students interested in accounting are invited to become members of this club. Problems involving accounting are presented and discussed at club meetings. Upperclassmen present problems arising out of thesis or co-operative work experience, and able practitioners from the professional world are invited to present papers and lead the student discussions.

Advertising Club — Affiliated with the Junior Advertising Club of Boston and with the National Industrial Advertisers' Association through the Technical Advertising Association of Boston, this Student Chapter is committed to the development of professional associations and interests among its members.

Armed Forces Communication Association — This organization is composed of students interested in the development and research fields of electronic communication equipment and in the field of photography. The student chapter is a component of the national organization.

Art Club — The Art Club is open to all Northeastern students interested in sketching or painting. Weekly meetings are organized to provide instruction and guidance in pencil and charcoal sketching, water coloring, and oil painting. The regular program includes several field trips for practice in sketching or painting seascapes and landscapes. Several exhibitions of the work of members are held during the year.

Biology Club — The Biology Club (Nu-Beta) serves to stimulate interest in the biological sciences by presentations of motion picture films, lecturers and field trips. Membership is open to all students without restriction.

Camera Club — The Camera Club welcomes all men and women interested in photography. Weekly discussions and special evening lectures by guest artists are part of the yearly program. Field trips, monthly photo contests and a general exhibition add to the interest and progressive work of this organization.

Chemistry Society — The Chemistry Society is a student affiliate chapter of the American Chemical Society. Membership is open to upperclassmen majoring in chemistry or chemical engineering. Meetings are held twice during each term, at which times talks and motion pictures are given on various chemical subjects.

Chess Club — The Chess Club gives both beginners and experts an opportunity to enjoy the game. Yearly tournaments are held among the members and from time to time the Club engages in intercollegiate competition.

Debating Society — The purpose of the Debating Society is "to foster and pro-
mote an interest and facility in formal argumentation; to develop an impartial,
unbiased, and intellectual consideration of questions and issues of current
interest; and to sponsor intercollegiate relationships and competition in the
debating field." Membership is open to all students of the Day Colleges.

Dramatic Club — The Silver Masque affords an opportunity for those students
interested in dramatics to participate in the production of several pieces in the
course of the college year. Qualification for the cast and for positions on the
business staff is through competition under the direction of the faculty adviser.

Engineering Societies, National — Students in the several professional curricula
of the College of Engineering operate Northeastern University Sections of the
appropriate national professional societies. Chief among these are the following:

American Society of Civil Engineers
Boston Society of Civil Engineers
American Society of Mechanical Engineers
American Institute of Electrical Engineers
American Institute of Chemical Engineers
American Institute of Industrial Engineers
Society for the Advancement of Management
The Engineers' Council of Northeastern University

Members of the engineering faculty who hold membership in the parent
organizations serve as advisers to these student groups. Meetings are held
regularly and practicing engineers are invited to address the sections. Occasion-
ally appropriate motion pictures are shown, or the group visits some current
engineering project in the vicinity of Boston. The College of Engineering
encourages these student sections of the technical societies in the belief that they
provide a wholesome medium for social intercourse as well as a worthwhile
introduction to professional life.

Husky Key — This organization for the promotion of school spirit provides
special services at athletic events and for visiting teams and other groups.

Hus-Skiers — The purpose of the Hus-Skiers is to hold an integrated program
of ski activity, including weekend outings during the winter season. A tourna-
ment and carnival are held near the close of the season in which all members
are eligible to take part. The club holds charter membership in the New Eng-
land Intercollegiate Ski Conference. Skiing is recognized as a minor sport.

International Relations Club — The International Relations Club was founded
for the purpose of studying and discussing those current national and inter-
national events and issues which vitally concern our American life and institu-
tions. The club maintains contacts with similar organizations in other colleges.

Investment Society — The purpose of this society is to increase knowledge of the
investment field by providing opportunities for discussions and by arranging for
supplementary talks by outstanding personalities in the professional world of
finance.

All interested students are welcome at the meetings, which are held regularly
during each ten-week term.

Marketing Association — Students in the College of Business Administration maintain a student chapter of the American Marketing Association for the purpose of enhancing the professional development of its members. Meetings are held each ten-week period at which executives from Greater Boston discuss current issues in the field.

Mathematics Society — The Mathematics Society encourages the study of topics of mathematical interest which are either outside or beyond the scope of the regular mathematics courses. Membership is restricted to those men and women who have completed one and one-half years of study in mathematics and have an average grade of not less than "C" in mathematics courses up through differential calculus. Although membership is limited to upperclassmen, freshmen especially interested in mathematics are always welcome at meetings of the Club.

The final program of the year is devoted to a dinner meeting for which some prominent outside speaker is procured.

Military Affiliate Radio Program — Membership is open to interested amateur radio operators for rendering radio communication in the event of a civil or military emergency. Operations are conducted on a daily schedule at station KIWAS located at the Greenleaf Building.

Musical Clubs — The Department of Student Activities sponsors musical clubs, such as the following: concert orchestra, band, chorus, and dance orchestra, for which all students with musical ability are eligible. Membership in the various musical clubs is attained by competitive effort.

Omega Sigma Society — This society is the organization for all women students enrolled in the Day Colleges. It is responsible for a large number of the social activities for women and sponsors many programs of cultural and educational value. Each year, as a part of the social program, Omega Sigma gives a Mother and Daughter Tea, arranges a Big Sister Banquet — a "get-acquainted" affair in the fall — and a Senior Banquet in June. The society organizes outings; it holds general meetings to which guest speakers are invited; it cooperates with the Student Union in giving an annual Christmas party for children from community centers. In all, Omega Sigma offers opportunity for closer friendship, for spirited participation in wholesome activity, and for leadership development.

Pershing Rifles — Student ROTC chapter of a national organization formed to encourage, preserve, and develop the highest ideals of the military profession, to promote American citizenship, to create a closer and more efficient relation, and to provide appropriate recognition of a high degree of military ability among the cadets of the senior Reserve Officers' Training Corps.

Psychology Society — An organization in which interests in technical psychology are pursued. The membership is open principally to majors in the field of psychology, but this does not preclude from participation any or all students who have an active interest in psychology.

Radio Club — One of the most popular undergraduate activities is the Radio Club. Members are provided opportunity for code practice and are encouraged to obtain their amateur licenses. The club owns and operates station W1KBN,

a short wave transmitter, located in the Radio Laboratory in the penthouse of Richards Hall. Meetings are held about once a month for the discussion of technical matters. Practicing radio engineers are frequently invited to address the club at evening meetings, when students in both divisions may attend.

Rifle Team — Composed of ROTC and non-ROTC members who compete in shoulder-to-shoulder and postal matches, firing with a .22 caliber rifle. Equipment for this organization is furnished by the ROTC department. The rifle team is recognized as a minor sport by the University.

ROTC Band — Composed of ROTC and non-ROTC members; performs at military parades and reviews, football rallies and games, and other student activities. Uniforms and musical instruments are provided by the Department of Military Science.

Society of American Military Engineers — Membership is made up of engineering students who are interested in the development and research activities of military engineering. Student chapter is a component of a national organization.

Square and Folk Dance Society — This organization is composed of students interested in learning the techniques and forms in folk dancing. Demonstrations are given before the general student body from time to time throughout the year.

Tennis Club — Tennis players will find this club interesting and helpful in arranging intramural tournaments.

Yacht Club — The Yacht Club is a member of the Intercollegiate Yacht Racing Association. The club participates in regattas held in the Charles River Basin and also in regattas held at other colleges. Yachting is recognized as a minor sport.

Class Organization and Activity

Each of the classes in the Day Colleges elects its officers and carries on activities as a class. Dances are sponsored by the classes at regular periods throughout the year. One of the highlights of the social program is the Junior Promenade, held each spring at one of the Boston hotels.

Seniors plan a number of activities just prior to Commencement.

Convocations

The hour from 12:00 to 1:00 on Wednesdays throughout the year is reserved by the University for convocations and other large meetings. Attendance at convocations is compulsory. Among these meetings are included three all-Day College meetings at Symphony Hall known as the Fall Convocation, Honors Convocation, and Alumni Convocation which bring before the student body some of the ablest and foremost leaders of our country. When the reserved hour is not occupied by a University meeting, concerts, athletic rallies, and class meetings may be held instead. Such meetings are under the direction of the Department of Student Activities.

Fraternities

There are at present nine local Greek letter fraternities chartered by Northeastern University. Each fraternity is provided with a faculty adviser who is

responsible for the proper administration of the fraternity house under the rules and regulations established by the faculty. The list of fraternities in the order of their establishment is as follows:

1. Beta Gamma Epsilon
2. Alpha Kappa Sigma
3. Nu Epsilon Zeta
4. Sigma Kappa Psi
5. Phi Beta Alpha
6. Phi Gamma Pi
7. Sigma Phi Alpha
8. Kappa Zeta Phi

9. Gamma Phi Kappa

Elected representatives from each fraternity make up an Inter-Fraternity Council, a body which has preliminary jurisdiction over fraternity regulations. Its rulings are subject to the approval of the Faculty Committee on Student Activities.

The Co-operative Plan

What It Is

The Co-operative Plan of Education is founded on the educational philosophy that supervised employment in the occupational field for which a student is training enhances comprehensive learning and vocational adaptation. It utilizes, in addition to the usual classroom and laboratory exercises, the practical values of the work-a-day-world environment, thereby enabling the student not only to become acquainted with certain job skills and operations concurrently with his academic training but also to develop his confidence and capacity to arrive at intelligent conclusions based upon a knowledge of practice as well as of theory.

All Northeastern co-operative curricula are five years in length, comprising a freshman year of three consecutive ten-week terms of academic study followed by four upperclass years on the Co-operative Plan.

How It Works

The Co-operative Plan works in the following manner. Upperclassmen, including both men and women, are divided into two nearly equal groups, one of which is called Division A and the other Division B. Each student is assigned a job with some business or industrial concern. The Division A students start the college year with a term of classroom work, while the Division B students start the year with a term at co-operative work. At the end of that term, the Division A students go out to work with a co-operating firm, while their places in the classrooms are then taken by their alternates, the corresponding Division B students. When the next term has passed, the Division A students return to college and the Division B students resume their co-operative work. The alternation of work and classroom study continues throughout the year so that each upperclassman has two terms of ten weeks and one of five weeks at college, two terms — one of ten weeks and one of sixteen weeks — at co-operative work, and a one-week vacation.

Similarly, each co-operating employer is thus assured of continuous service of a pair of co-operative students alternating with each other throughout the calendar year. This assurance naturally tends to stabilize employment and encourages the co-operation of employers.

Faculty Co-ordinators

Each student is assigned to a co-ordinator who is responsible for all phases of the co-operative work program for his group of students. He interviews them during the freshman year and discusses with them various vocational objectives and answers such questions as the students may have in regard to the many activities of business and industry. He studies them in the light of their physical condition, scholastic attainment, interests, aptitudes, and other factors bearing upon their qualifications for vocational assignment. These interviews culminate in an agreement between the student and his co-ordinator regarding the co-operative assignment on which the student will be placed. During each of the terms at college immediately succeeding a term at co-operative work, the co-ordinator confers with the student concerning the job experiences acquired and other matters relating to vocational adjustment or personal problems while on the job. The reports of the employer on the achievements and performance of the student are discussed and interpreted in the interest of further co-ordination and more effective learning. In this way the progress of all students is observed and co-ordinated with their college work to the end that maximum values are obtained from their training at Northeastern.

Placement

The co-ordinator visits co-operating firms and arranges with them for the employment of students under his charge. The range of opportunities available to Northeastern students is wide, including practically all occupational activities for which their academic training, personal attributes, and vocational aptitudes qualify them. In general, the first year of co-operative work can be expected to be of a routine nature through which students may prove their fitness for more responsible work. A job assignment directly related to the student's field of study and vocational training is the prime objective of the co-ordinator. The jobs upon which Northeastern students are employed are in no sense protected opportunities or purely observational assignments. They are regular jobs under actual business conditions and are held in competition with other sources of supply. The only special privilege accorded Northeastern students is that of attending college on the Co-operative Plan and the opportunity to merit by superior performance progressive advancement on the job.

Supervision and Guidance

While the University does not adopt a paternal attitude toward co-operative work, it nevertheless assumes certain responsibilities toward students and co-operating firms. Co-ordinators visit regularly each job to which students in his charge are assigned. He solicits from the employer an oral report upon the student's progress and achievement. This supplements the card report sent to the co-ordinator at the close of each work term. Any adjustments that may have seemed necessary or advisable are arranged at this time. Progress on assignments, schedules of training, advancement and transfers to new responsibilities are discussed and evaluated.

Through a series of co-operative work reports prepared during their working periods, students are led to analyze their jobs and to develop a thoughtful and investigative attitude toward their working environment. A most important phase of co-operative work is the opportunity afforded for guidance by the frank

discussion of actual problems encountered on the job. The intimate contact between co-ordinator and student is of great worth in helping the student to get the most value from the co-operative work assignment. While the University endeavors to provide every possible opportunity for its students, it expects them at the same time to take the initiative and to assume the responsibility involved in their individual development. To every student are available the counsel and guidance of the faculty, and every resource at its disposal. But the faculty does not coerce students who are uninterested or unwilling to think for themselves.

The Co-operative Plan is thus designed specifically to provide actual working opportunities which afford the students practical experience, give meaning to their program of study, and train them in reliability, efficiency, and teamwork.

Correlation of Theory and Practice

Co-operating companies employ the students, both men and women, in the various departments of their establishments. The training is thorough. To derive the greatest value from co-operative work the student is encouraged to continue in the employ of the co-operating firm for at least one year after gradu-ation, since certain types of work which would afford valuable experience cannot be made available during the alternating period of work and study. Statistics compiled over a period of many years show that from thirty-five to fifty-three per cent of each graduating class remains with co-operating employers after graduation.

Co-operative Work Reports

The values to be derived from practical experience are further enhanced by required report writing. These co-operative work reports are written during the working periods by all co-operative students. A complete job analysis is required as the first report written on any new co-operative work assignment. Subjects of other reports are selected by the student after conference with the Co-ordinator of Co-operative Work, by whom they must be approved. The reports are designed to encourage observation and investigation on the part of the students and to help them to appreciate more fully the extent and value of their experience.

Co-operating employers are particularly interested in reading these reports before they are submitted to the co-ordinators. This affords an unusual oppor-tunity for the student to place himself directly before top management and have his ideas and accomplishments evaluatea periodically. These reports are care-fully read by the co-ordinator and are discussed with the student during the following college period. Exceptionally valuable results are obtained from these reports. The value derived must necessarily be directly proportional to the conscientious and intelligent concentration of effort by the student upon this phase of the work.

Co-operative Work Records

Complete and detailed records are kept of the co-operative work of each student. They are based upon reports made by the employer at the end of each working period, upon occasional personal conferences between the employer and the co-ordinator, and upon various evidences of the student's attitude toward all the phases of his co-operative work. It is not possible for the student to secure a degree unless this part of the curriculum is completed satisfactorily.

These records of practical experience serve as a valuable reference for future Alumni Placement.

Positions Available

Because of uncertainties of business conditions, as well as other reasons beyond its control, the University cannot and does not guarantee to place students. However, past experience has demonstrated that students who are willing and capable of adapting themselves to existing conditions are almost never without employment except in periods of severe industrial depression.

Earnings

It should be understood that the primary purpose of the Co-operative Plan is training. The rates of pay for students tend to be lower than might reasonably be expected on full-time productive types of jobs such as would ordinarily be available to youth of corresponding age and training, because students are given the privilege of attending college on the Co-operative Plan and because the purpose is to provide the student with the opportunity of advancing on the job concurrently with his academic progress. Frequently this involves transfer, at reasonable intervals, from one department to another of the co-operating company.

Location of Work

It is the policy of the University to assign students to co-operative work within commuting distance of their homes. This is not always possible, however, and at times it may be necessary for students to live away from home in order to obtain satisfactory and desirable co-operative work assignments.

Types of Co-operative Work

In so far as possible students are placed at co-operative work in that general field for which they express preference provided that aptitude, physical ability, temperament, and other personal qualities appear to fit them for this field. Usually students are placed first in those jobs of an organization where they may learn the fundamental requirements of the business.

For example, the first year of a training program in a manufacturing establishment might be as an operator of machines. This provides the opportunity to acquire intimate knowledge of the equipment, methods, and operations of some of the processing departments of raw materials and products in process of manufacture. The second year might be as an expediter or on assignments with the maintenance and installation department. Such work would require contact with the several production and operating departments of the plant and would provide the opportunity for a comprehensive and correlated study of all operations, plant layout, routing of raw, semi-processed, and finished materials — in other words, a perspective view of the interrelationship of departments. By this time, the student will have progressed to the academic stage where "application" courses will be included in the program and the next year of co-operative work might be devoted to testing, inspecting, methods analysis or the like. The last year would be devoted to initial training in that department for which the student was aiming ultimately to qualify. Thus, in the course of a period of four years of co-operative training, the student would have the opportunity to acquire a substantial background in at least some of the functions of the factory

administration. This progressive type of training is ordinarily obtained in the employ of one company. A change of company each year usually provides more a change of environment than a progression of experiences.

All types of enterprises employ Northeastern co-operative students. The limitation is determined by the interests and career objectives of the students enrolled at the time. They include engineering firms, manufacturing companies, public utilities, banks, railroads, insurance companies, wholesaling and retailing outlets, hospitals, social agencies, publishers and advertising houses, libraries, development and research organizations, etc. Definite training schedules have been established with several of the co-operating companies. The ultimate objective of such schedules is absorption of the graduates into the permanent employ of the company, although such absorption is based on merit rather than guarantee.

Admission Requirements

Applicants for admission to the freshman class must qualify by graduation from an approved course of study in an accredited secondary school, including prescribed subjects listed below.

Applicants are not required to take entrance examinations in high school subjects, but all candidates for the freshman class are asked to come to Northeastern University to take scholastic aptitude tests.

In the event that the distance to Boston from an applicant's place of residence is great, the Committee on Admissions is willing to make a decision on test results submitted by the College Entrance Examination Board.

College of Education

Admission Requirements

1. Graduation from an approved course of study in an accredited secondary school, including

English (4 years)	3 units
Choice among: Science, Mathematics, Social studies, Modern languages	6 units
Electives	6 units
Total	15 units

2. Evidence of strength in those subject matter fields in which the applicant intends to teach.
3. Possession of those personal qualities which the successful teacher needs.
4. The satisfactory completion of competitive scholastic aptitude examinations given by the University.

College of Liberal Arts

Admission Requirements

1. Graduation from an approved course of study in an accredited secondary school, including

English (4 years)	3 units
Choice among:	
*Mathematics, †foreign language, natural science and/or social studies	6 units
Electives	6 units
Total	15 units

2. The satisfactory completion of competitive scholastic aptitude examinations given by the University.

* Students expecting to major in biology, chemistry, mathematics and physics, premedical, premedical technology, or predental must offer 2 units in algebra and 1 unit in plane geometry, and those who are planning to major in chemistry, mathematics, or physics must also present 1 unit in physics.
† In foreign languages not less than two full units in any one language will be accepted.

College of Business Administration

Admission Requirements

1. Graduation from an approved course of study in an accredited secondary school, including

English (4 years)	3 units
Mathematics	1 unit
Natural science	1 unit
Choice among:	
Science, social studies, mathematics, and/or foreign language	6 units
Electives	4 units
Total	15 units

2. The satisfactory completion of competitive scholastic aptitude tests given by the University.

College of Engineering

Admission Requirements

1. Graduation from an approved course of study in an accredited secondary school, including

English (four years)	3 units
Algebra (through quadratics)	2 units
Plane geometry	1 unit
Physics	1 unit
Choice among:	
Solid geometry	
Trigonometry	
Advanced algebra	
Science	6 units
Social studies	
Foreign languages	
Electives	2 units
Total	15 units

2. It is urgently recommended that engineering candidates offer solid geometry, advanced algebra, or trigonometry among their credit units.
3. The satisfactory completion of competitive scholastic aptitude examinations given by the University.

Other Requirements

These formal requirements are necessary and desirable in that they tend to provide all entering students with a common ground upon which the first year of the college curriculum can be based. But academic credits alone are not an adequate indication of a student's ability to profit by a college education. Consequently, the Department of Admissions takes into consideration a student's interests and aptitudes in so far as they can be determined, capacity for hard work, attitude toward classmates and teachers in high school, physical stamina and, most important of all, character. In this way the University seeks to select for its student body those who not only meet the academic admission requirements but who also give promise of acquitting themselves creditably in the rigorous program of training afforded by the Co-operative Plan and of becoming useful members of society.

Personal Interview

A personal interview is always preferred to correspondence. Effective guidance depends in large measure upon a complete knowledge of a student's background and problems.

Applicants who come from a distance are advised to write in advance to see if it is possible to arrange for an interview and for the required scholastic aptitude tests on the same day. The examinations are scheduled only on Saturday mornings, at dates to be announced.

Office hours are from 9:00 A.M. to 4:00 P.M. daily; Saturdays to 12:00 M.

Application for Admission

Each applicant for admission is required to fill out an application blank stating previous education.

A fee of ten dollars ($10.00) is required when the application is filed. This fee is nonreturnable.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required ten-dollar fee to Director of Admissions, Northeastern University, Boston 15, Massachusetts. Checks should be made out to Northeastern University.

Upon receipt of the application, properly filled out, the University secures the references and secondary school record. Applicants having satisfactory secondary school records are notified to report at the University to take special scholastic aptitude tests. As soon as possible after the Committee on Admissions has reviewed the results of these tests a report of status with respect to admission will be sent to each candidate.

Early filing of applications is recommended.

The University reserves the right to place any entering student upon an indefinite trial period.

Tuition Deposit

Applicants accepted for admission must upon request pay a nonreturnable tuition deposit of twenty-five dollars ($25.00) as evidence of their intention to enroll and this will be applied on their first tuition payment.

Registration

Freshmen will register at the University on Wednesday, September 8, 1954, and Wednesday, November 17, 1954. Students are not considered to have met the requirements for admission until they have successfully passed the required physical examination. Registration must be in person.

Advanced Standing

Students transferring from approved colleges will be admitted to advanced standing provided their records warrant it. Whenever a person enters with advanced standing and later proves to have had inadequate preparation in any prerequisite subjects, the faculty reserves the right to require the student to make up such deficiencies.

Applicants seeking advanced standing should arrange to have transcripts of their previous college records forwarded with their initial inquiry.

Outline of Freshman Courses

The first year is a period of full-time study during which the student must demonstrate fitness for the program which has been elected. For students enrolled in the Colleges of Liberal Arts, Business Administration, or Engineering, the Co-operative Plan of training on the job begins with the second year. Students who are unsuccessful in the basic courses of the freshman year will not be permitted to continue with their advanced program, but will be advised to change their goal and type of training. In some instances this will mean change to another curriculum at Northeastern; in others, withdrawal from the institution. *The freshman courses are so arranged as to permit change of objective during or at the end of the first year with a minimum loss of time.*

General Information

College Expenses

Tuition and Fees

Freshmen — The charge for tuition, including the University Activities Fee, for all freshmen is $175.00 per term, payable as indicated in the schedule below.

Engineering Upperclass Co-operative Students—The charge for tuition, including the University Activities Fee, for all Engineering upperclassmen on the Co-op-erative Plan is $220.00 per regular term and $110.00 per summer term.

Liberal Arts and Business Administration Upperclass Co-operative Students — The charge for tuition, including the University Activities Fee, for all Liberal Arts and Business Administration students on the Co-operative Plan is $200.00 per regular term and $100.00 per summer term.

Schedule of Tuition and Fee Payments, 1954–1955

FOR FRESHMEN

DIVISION S	Tuition and Fee	DIVISION N
September 8, 1954	$175	November 17, 1954
November 22, 1954	175	January 31, 1955
January 31, 1955	175	April 11, 1955

Prior to admission to the second year, all students in the College of Education are required to complete a 5-week summer term the charge for which is $100.

FOR UPPERCLASSMEN (Co-operative Plan)

DIVISION A	Tuition and Fee Engineering	Tuition and Fee Liberal Arts and Business Admin.
September 13, 1954	$220	$200
January 31, 1955	220	200
August 8, 1955	110	100
DIVISION B		
November 22, 1954	$220	$200
April 11, 1955	220	200
June 20, 1955	110	100

FOR UPPERCLASSMEN

(Full-time Plan for Preprofessional Students in Liberal Arts only and College of Education)

	Tuition and Fee*
September 13, 1954	$200
November 22, 1954	200
January 31, 1955	200

* These payments cover three ten-week terms of instruction. Students who elect to continue for a fourth term pay an additional $200 on April 11, 1955.

University Activities Fee

The University Activities Fee is included in tuition and is used for the operation of an extracurricular University program so designed as to meet in the best possible manner the recreational, health, social and cultural needs of the students. This fee supports such activities as dramatics, musical clubs, the Student Union, intramural games and sports, and intercollegiate athletics; includes membership in the Northeastern University Athletic Association and subscription to the *Northeastern News*, the college newspaper. Seniors receive a copy of the yearbook called the *Cauldron*, which is financed in part under this fee.

The University Activities Fee also covers the services of the college physician for emergency attention and general medical advice. Minor ailments are treated by the college health officers without additional charge. Any student who shows signs of more serious illness is immediately advised to consult a specialist or return home in order to receive further treatment.

Accident and Sickness Insurance

An excellent low cost accident and illness insurance covering "in-hospital" care is available to all Northeastern University students through a group insurance plan managed by Higham, Neilson, Whitridge, and Reid, Inc., of Boston.

The cost of this insurance is $15 for the calendar year, payable in advance. *Students living away from home are required to participate in the plan;* commuters may do so if they wish. Circulars giving details of the insurance coverage will be sent to all candidates at the time their applications for admission to the University are accepted.

Chemical Laboratory Deposit

(Applies only to students taking chemistry and chemical engineering laboratory work)

Freshmen taking chemistry make a Chemical Laboratory deposit of fifteen dollars ($15.00) at the beginning of the year from which deductions are made for breakage, chemicals, and destruction of apparatus in the laboratory.

Upperclassmen taking chemistry or chemical engineering laboratory work make deposits at the beginning of each such term as follows:

Sophomores and Middlers...$10
Juniors... 20
Seniors... 15

Reserve Officers Training Corps — Uniform Deposit

Freshmen taking R.O.T.C. training make a deposit of ten dollars ($10.00) at the beginning of the year from which deductions are made for loss or damage to the uniform and equipment furnished to them.

Any unused portion of this deposit will be returned to the student upon graduation, or upon withdrawal from the R.O.T.C. program. If the charge for loss or damage to uniform or equipment is more than the sum deposited the student will be charged the additional amount.

Application Fee

A fee of ten dollars ($10.00) is required when the application for admission is filed. This fee is nonreturnable.

Late Payment Fee

There will be a $2.00 late payment fee added to all bills which are not paid by the Saturday following the date on which payments fall due.

Failure to make the required payments on time, or to arrange for such payments, is considered sufficient cause to bar the student from classes or suspend him from co-operative work until the matter has been adjusted with the Registrar.

Late Registration Fee

A fee of $5.00 will be charged for failure to register in accordance with prescribed regulations on the dates specified in the college registration bulletins.

Graduation Fee

A fee of twenty dollars ($20.00) covering graduation is required by the University of all candidates for a degree. This fee must be paid before the end of the seventh week of the second term in the senior year.

Payments

All payments should be made at the Central Office which is located on the first floor of Richards Hall. Checks should be made payable to Northeastern University.

Refunds

The University provides all instruction and accommodations on an academic term basis; therefore, *no refunds are granted except in cases where students are compelled to withdraw on account of personal illness or to enter the armed services of the United States.*

Expenses

The following tables, compiled from expense returns submitted by the student body, give an idea of freshman expenditures under ordinary conditions.

Estimated College Expenses for a Freshman

Application Fee	$ 10.00
Tuition and Fees	525.00
Chemical Laboratory Deposit	15.00
Books and Supplies	60.00
Accident and Sickness Insurance (optional for commuters)	15.00
R.O.T.C. Deposit (for those electing R.O.T.C. only)	10.00
	$635.00

(*Engineering students should add approximately $50.00 for drawing instruments and equipment.*)

Estimated Living Expenses Per Week for a Freshman Residing Away from Home

Room Rent	$ 6.00–$ 8.00
Board	16.00– 20.00
Laundry	3.00– 3.00
Incidentals	2.00– 2.00
	$27.00–$33.00

The figures given above are approximate and may not exactly apply to any one student; however, they will be found to represent fairly well the expense of a freshman who lives comfortably but without extravagance.

Policy on Changes of Program

The University reserves the right to withdraw, modify, or add to the courses offered or to change the order or content of courses in any curriculum.

The University further reserves the right to change the requirements for graduation, tuition and fees charged, and other regulations. However, no change in tuition and fees at any time shall become effective until the school year following that in which it is announced.

Any changes which may be made from time to time pursuant to the above policy shall be applicable to all students in the school, college, or department concerned, including former students who may re-enroll.

Textbooks and Supplies

The Northeastern University Bookstore, located on the ground floor of Richards Hall, is a department of the University and is operated for the convenience of the student body. All books and supplies which are required by the students for their work in the University may be purchased at the Bookstore.

All students may purchase Day College required textbooks which are for their own use at a ten per cent discount. The ten per cent discount will not apply on equipment, supplies, or novelties. It is the policy of the Bookstore, however, to stock these materials and to sell them at the lowest possible prices.

Part-time Work

Students who find it necessary to accept part-time jobs while attending college may obtain such work through the Director of Co-operative Work.

Students are not justified in assuming that the University will take care of their expenses or guarantee to supply them with work sufficient to meet all their needs.

A student should have available a reserve fund adequate to provide for immediate needs and unexpected contingencies. This should ordinarily amount to at least the first year's tuition plus books and supplies, room rent, and board for several weeks or a total of about $750.00.

Grades and Examinations

Examinations

Examinations covering the work of the term are usually held at the close of each term. Exceptions may be made in certain courses where, in the opinion of the instructor, and with the approval of the Dean of the College concerned, examinations are not necessary.

Condition Examinations

Condition examinations are usually given once each year for each division. The charge is three dollars ($3.00) for each condition examination.

The responsibility for the removal of a condition rests with the student, who is required to ascertain when and how the condition can be removed.

Special Final Examinations

Students who have been given permission to make up missed final examinations will be charged a single fee of $5.00 covering all of the examinations missed during a given final examination period.

Senior Condition Examinations

No condition examinations in last term senior courses are offered at the end of the last term. This means that a failure in a last term senior course cannot be made up before Commencement.

Grades

A student's grade is officially recorded by letter, as follows:

A   outstanding attainment
B   above-average attainment
C   average attainment

D lowest passing grade, poor attainment (the faculty will accept only a limited amount of grade D work toward the Bachelor's degree)

F failure, removable by condition examination

FF complete failure, requires the student to repeat the course unless the Executive Committee grants, upon petition, other special arrangements

I incomplete, used for intermediate grades only to signify that the student has not had time to make up work lost through excusable enforced absence from class

L used in all cases of the removal of a failure by condition examination or by attendance at summer term

WP Withdrew from course — passing

WF Withdrew from course — failing

A student who does not remove a condition before that course is again scheduled, a year later, must repeat the course unless excused by special action of the Executive Committee. A condition in more than one subject may involve the loss of assignment to co-operative work.

The responsibility for the removal of a condition rests with the student, who is required to ascertain when and how the condition can be removed.

Dean's List

A Dean's List, issued at the end of each term, contains the names of upperclass students who have a 3.0 weighted average in all subjects with no grade below C during the preceding period. Freshmen who meet the same standards in their work are included on a Freshman Honor List. No student subject to disciplinary action is eligible for either list.

Reports on Scholastic Standing

Reports for all students are issued at the end of each grading period. Questions relative to grades are to be discussed with the student's faculty adviser.

Students are constantly encouraged to maintain an acceptable quality of college work. Parents and students are always welcomed by the college officers and faculty advisers for conference upon such matters.

Parents or guardians will be notified whenever students are advised or required to withdraw from the University. If parents so request, report cards will be sent to them instead of to the student.

Reserve Officers Training Corps

Male students in the College of Liberal Arts, the College of Engineering, the College of Business Administration, and the College of Education may elect the R.O.T.C. basic training if they are physically qualified. Engineer and Signal Corps units are maintained at the University. Students who have successfully completed the two-year basic program are interviewed and selected for the Advanced Program by the Professor of Military Science and Tactics. The Advanced R.O.T.C. program extends over the final three years of the five-year co-operative curricula leading to the baccalaureate degree. The R.O.T.C. program is also available to full-time students who plan to graduate in four years. See page 189 for details of the R.O.T.C. program.

General Conduct

Conduct

It is assumed that students come to the University for a serious purpose and that they will cheerfully conform to such regulations as may from time to time be made. In case of injury to any building or to any of the furniture, apparatus, or other property of the University, the damage will be charged to the student or students known to be immediately concerned; but if the persons who caused the damage are unknown, the cost for repairs may be assessed equally upon all the students of the University.

Students are expected to observe the accepted rules of decorum, to obey the regulations of the University, and to pay due respect to its officers. Conduct inconsistent with the general good order of the University or persistent neglect of work may be followed by dismissal; if the offense be a less serious one, the student may be placed upon probation. The student so placed upon probation may be dismissed if guilty of any further offense.

It is desired to administer the discipline of the University so as to maintain a high standard of integrity and a scrupulous regard for truth. The attempt of any student to present any work which is not his or her own, or to pass any examination by improper means, is regarded as a most serious offense and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is also held to be a grave breach of discipline.

Scholastic Year for Seniors

Seniors of either division who are candidates for a degree in the current year must have completed all academic work, class assignments, theses, regular and special examinations, before twelve o'clock noon of the Saturday next following the close of recitations for seniors.

Attendance

Students are expected to attend all exercises in the subjects they are studying unless excused in advance.

No cuts are allowed. A careful record of each student's attendance upon class exercises is kept. Absence from regularly scheduled exercises in any subject will seriously affect the standing of the student. It may cause the removal of the subject or subjects from the student's schedule.

Laboratory work can be made up only when it is possible to do so during hours of regularly scheduled instruction.

Absences from exercises immediately preceding or following a recess are especially serious and entail severe penalties.

Attendance at all mass meetings of the student body is compulsory. Exceptions to this rule are made only when the student has received permission from the Director of Student Activities previous to the meeting from which absence is desired.

Student Housing

Housing Regulations (Men)

The University does not maintain dormitories for men and cannot guarantee housing accommodations to students who live away from home, but does

endeavor to exercise due consideration and care for the students' welfare while they are in residence. This necessitates the adoption of the rules and regulations presented herewith.

1. The Registrar's Office will assist students in obtaining suitable housing. Whenever possible a student should try to make arrangements for housing several days in advance of registration.
2. Students may inspect rooms suggested to them before definitely renting them. After a student has decided to take a room obtained through the assistance of the Registrar's Office, he must notify that office as soon as possible.
3. All students who are assisted in finding·rooms by the Registrar's Office must retain the room for the period of their residence unless prior permission to change has been granted by the Registrar.
4. Students are not permitted to live in unsupervised quarters. Under no conditions are groups of students permitted to lease apartments or houses.
5. Students are not permitted to engage living quarters without prior approval of the Registrar. Those violating this rule will be required to give up such rooms immediately and will be assisted by the Registrar's Office in obtaining other quarters.

Rooms in the residence area of the Huntington Avenue Branch of the Boston Y.M.C.A. may be secured only through the Department of Housing Services of the Y.M.C.A. The applicant must present himself in person to a representative of the Department before assignment will be made. Applicants are advised to write the Department of Housing Services of the Huntington Avenue Branch, 316 Huntington Avenue, Boston, Massachusetts.

Fraternity Housing (Men)

Certain fraternities provide excellent opportunities for room and board for men at reasonable rates. Information regarding these housing facilities may be obtained from the Registrar.

Housing for Women

Women's Residences, under the supervision of housemothers, are maintained by the University at 428 and 402 Marlborough Street, Boston. Board and room is provided at reasonable rates. Information regarding these Residences may be secured from the Director of Admissions.

Women students living away from home are required to live in the Marlborough Women's Residences unless other arrangements are approved in advance by the Dean of Women.

Freshman Counseling

Freshman Orientation Period

In order that freshmen may be ready to pursue their academic work with greater composure and be somewhat acclimated before the beginning of scholastic work, three or four days prior to the first term are devoted to a freshman orientation period. All freshmen are required to attend all exercises at the University scheduled during the orientation period.

Freshman Orientation Class

All freshmen attend an orientation class once each week for the first twenty weeks. This class is designed to instruct the student in the traditions, activities, and procedures of the University. Time is devoted to the proper methods of study for success in college and stress is placed on attitudes for success in later life. About a third of the classes are devoted to techniques and procedures of work under the Co-operative Plan.

Physical Examination

All freshmen receive a physical examination at the University during the orientation period. All students are expected to report promptly at the appointed time for examination. Those who fail to appear at the appointed time will be charged a special examination fee of two dollars ($2.00).

Freshman Counselors

At the time of matriculation each freshman is assigned to a personal adviser, a member of the faculty, who serves as an interested and friendly counselor during the perplexing period of transition from school to college. The aim of the freshman advisory system is primarily to guide students through their first year. General counseling is under the direction of the Dean of Freshmen and the Dean of Students, assisted by a clinical psychologist, who handles the diagnosis and remedial treatment of difficult problem cases. Direct counseling of women students is under the supervision of the Dean of Women.

Individual Attention to Freshmen

Attention is given not only to the scholastic problems of the student, but also to personal problems in which advice is needed and desired. The aim is to help the student to the fullest possible personal development.

The college records of all students are periodically analyzed in the light of what may reasonably be expected from them in view of their previous school record, their scores on psychological tests, and all other factors in their situations. If they are not doing their best work, investigations are made to determine and eliminate the causes.

Educational Guidance

The Dean of Students Office is prepared through its testing and general information facilities to provide guidance for students who are uncertain about their educational objectives. While the service is restricted to students registered at the University, it is available throughout the academic year to any regularly enrolled student who applies for it.

Scholarships, Prizes, and Awards

Requests for Freshman Scholarships should be on file with the Director of Admissions not later than May 1, of the current year.

Trustee Scholarships

Established in 1928 by the Board of Trustees of Northeastern University. Each year the University grants in the three Day Colleges full and partial tuition scholarships to entering freshmen who have demonstrated throughout their

preparatory or high school course superior scholastic attainment. For additional information relative to these scholarships, communicate with the Director of Admissions.

Charles Hayden Memorial Scholarships at Northeastern University

The Charles Hayden Foundation, created by the will of the late Charles Hayden, an alumnus of the Boston English High School, offers annually memorial scholarships to freshmen at Northeastern University. The scholarships are awarded to "deserving boys" whose parents are unable to finance the entire cost of their education. To be eligible for consideration a student must have graduated from the English High School or from one of the following high schools in Boston and its metropolitan area: Arlington, Belmont, Boston (Brighton, Charlestown, Commerce, Dorchester, East Boston, English, Hyde Park, Jamaica Plain, Boston Technical, Public Latin, Roslindale, Roxbury Memorial, South Boston), Braintree, Brookline, Cambridge (High and Latin, Rindge Technical), Canton, Chelsea, Dedham, Everett, Lexington, Malden, Medford, Melrose, Milton, Needham, Newton, North Quincy, Quincy, Revere, Somerville, Stoneham, Wakefield, Waltham, Watertown, Wellesley, Weston, Weymouth, Winchester, Winthrop, Woburn. Full particulars concerning these scholarships may be obtained from the Director of Admissions of Northeastern University.

Dean's List Scholarships

Established in 1929. Annually at the Dean's List Dinner three scholarships of one hundred dollars each, known as the Dean's List Scholarships, are presented to the students with the outstanding records in the sophomore, middler, and junior classes. These scholarships are applicable to the recipients' tuition the first term of the following year.

President's Letter

Established in 1929. At the time of the award of the Dean's List Scholarships a President's Letter is presented to the senior student who leads the seniors in the Day Colleges in scholastic achievement. The letter is a congratulatory one from the President of the University and is a coveted prize.

Sears B. Condit Honor Awards

Established in 1940 through the generosity of Sears B. Condit. In the fall of the year at a University convocation Sears B. Condit Honor Awards, not less than twenty in number, are awarded annually to outstanding students in the upper three classes of the College of Liberal Arts, the College of Business Administration, and the College of Engineering. Each award carries a stipend of not less than one hundred dollars as well as a certificate of achievement.

Boston Society of Civil Engineers Scholarship in Memory of Desmond FitzGerald

Established in 1931 by the Boston Society of Civil Engineers in memory of Desmond FitzGerald, a former president of the Society and an eminent hydraulic engineer with a distinguished record of service. It has been awarded annually

since 1931 to an outstanding Northeastern University senior or junior student in the Department of Civil Engineering of the College of Engineering. The presentation is made by the President of the Boston Society of Civil Engineers at a College of Engineering convocation in the spring of the year.

Tau Beta Pi Award

Massachusetts Epsilon Chapter of Tau Beta Pi Association, national honorary society in engineering, offers annually a scholarship of one hundred dollars to the sophomore in the College of Engineering who, during the previous year as a freshman, made the highest scholastic record.

The Sigma Society Award

The Sigma Society, the honorary society of the College of Business Administration, offers annually a scholarship of one hundred dollars to the sophomore in the College of Business Administration who, during the previous year as a freshman, made the highest scholastic record.

The Academy Award

The Academy, the honor society of the College of Liberal Arts, offers annually a scholarship of one hundred dollars to the sophomore in the College of Liberal Arts who, during the previous year as a freshman, made the highest scholastic record.

Omega Sigma Award

The Omega Sigma Society, composed of women students at Northeastern University, offers annually a scholarship of one hundred dollars to the woman student who, by high scholastic attainment and by demonstration of the quality of leadership, has proven herself the outstanding woman student of the year.

Henry B. Alvord Memorial Scholarship in Civil Engineering

Established in 1940 in memory of the late Henry B. Alvord, Professor of Civil Engineering and Chairman of the Department for eighteen years. The award is made annually to a student graduating from an accredited secondary school who has demonstrated superior academic ability and gives promise of succeeding in civil engineering. The grant of two hundred and fifty dollars is made only to an entering freshman who is qualified for and plans to study civil engineering.

William J. Alcott Memorial Award

Established in 1934 by members of the faculty and other friends to perpetuate the memory of William Jefferson Alcott, Jr., a brilliant member of the Department of Mathematics in Northeastern University from 1924 until his death in 1933. The award is made annually from the income of the fund for outstanding scholastic achievement during the preceding year, either in a particular field of interest or for a superior academic record.

Public Speaking Contest

Established in 1922. Each year the University awards $100.00 in prizes at Public Speaking Contests for which all upperclass students in the Day Colleges are eligible. The speech content must be original and not over ten minutes in length.

The judges base their decision on appropriateness of subject, organization and scope of content, and general manner of delivery. Contestants are selected after a series of preliminary tryouts. The contest takes place before the student body assembled in a general mass meeting.

Annual Freshman Declamation

Established in 1948. Four finalists chosen from the entire Freshman class compete for $50.00 in prizes at a special convocation held in Alumni Auditorium. Contestants deliver from memory passages from famous orations or other suitable selections. Each speaker is limited to seven minutes and is judged on the basis of accuracy of rendition, interpretation, and effectiveness of delivery. The final contest is the culmination of preliminary tryouts in the Freshman English sections followed by highly competitive semi-finals before faculty judges.

Clara and Joseph F. Ford Scholarship Fund

Established in 1947 by friends and employees of Clara and Joseph F. Ford to provide tuition scholarships for worthy, needy, and well-qualified students who have demonstrated a democratic and tolerant spirit and who are well disposed toward people of all creeds and races.

Alumni Awards for Professional Promise

Established in 1947 by the Alumni Association of the Day Colleges. These awards are presented annually at the University Convocation sponsored by the Alumni of the Day Colleges. The awards are made to the outstanding seniors in each of the four Day Colleges who have demonstrated unusual professional promise through their character traits, scholastic achievement, and co-operative work performance.

William Lincoln Smith Scholarship Fund

Established in 1947 by Farnham Wheeler Smith, Class of 1924, Benjamin Lincoln Smith, Class of 1923, Thomas Hollis, Jr., Class of 1941, and other members of the family in honor of Dr. William Lincoln Smith who served long, faithfully, and with distinction as chairman of the Department of Electrical Engineering at Northeastern University. The income from the fund is to be used for an annual scholarship award to a student enrolled in the Department of Electrical Engineering who has demonstrated excellence in some aspect of electrical research or who stands high in his courses or who otherwise exhibits promise of future competence in the field. The award shall preferably be granted to a student who needs financial assistance to continue his college work.

Jewish Vocational Aid Society

The Jewish Vocational Aid Society has established a $1,000.00 revolving scholarship loan fund at Northeastern University to be available to upperclass students in the Colleges of Engineering, Liberal Arts, or Business Administration provided the students are taking work which has an acceptable vocational objective. It is possible for a student to receive a scholarship loan up to but not exceeding $150.00 in a term. Students desiring to receive help from this fund should come to the Dean of Students' office, 275 Richards Hall, for further information.

Associated Industries of Massachusetts Scholarships

The Associated Industries of Massachusetts annually awards to Northeastern University several thousands of dollars to be used for scholarships to help sons and daughters of workers in Massachusetts industries who are enrolled in the Day Colleges. The amount of each individual award is determined by a committee comprising the Dean of Students, the Director of Day Colleges, and the Director of Admissions. Primary purpose of the grant is to assist capable students who would otherwise be unable to continue their college education. The scholarships are available to both freshmen and upperclassmen.

The Henry Francis Barrows Scholarships

Established in 1949, the Henry Francis Barrows Scholarships at Northeastern University, provided under the will of Fanny B. Reed, offer Protestant young men, born and brought up in New England, four scholarships of $250.00 each. Good scholastic standing, good character, and need must be demonstrated by recipients of the scholarships. Applications may be made through the Dean of Students Office in Richards Hall.

American Society of Tool Engineers Scholarships

Established in 1950, the Boston Chapter of 'the American Society of Tool Engineers makes two annual awards, equivalent to one-half the annual tuition rate, each known as *The Boston Chapter American Society of Tool Engineers Scholarships at Northeastern University.* They are awarded to junior and senior students in the Industrial or Mechanical Engineering curriculum at Northeastern University. To be eligible for the award a student must have had honor standing for the previous academic year, be a resident of Greater Boston, be interested in tool engineering or allied fields of manufacturing, have satisfactory records at co-operative work, and be in need of financial assistance. The awards will be made only when qualified students apply.

Chemical Club of New England Scholarships

Established in 1952, two scholarships known as *The Chemical Club of New England Scholarships at Northeastern University* will be open to residents of New England, to junior and senior students in chemistry or chemical engineering with good academic and co-operative work records, who need financial assistance. Students must be planning to continue work in one of the two fields after receiving their degrees. The scholarships have been established to enhance interest in work in chemistry or chemical engineering in New England and to aid deserving students in these courses. The scholarships are $300.00 each. Applications for them may be made through the Dean of Students Office.

New England States Freshman Scholarships for Women

In addition to the usual Trustee Scholarships, certain special awards for girls entering the Freshman class are made each year.

Applicants for awards under these grants must have been graduated, with high scholastic standing, from an accredited secondary school; participation in student activities or young people's affairs and financial need are important considerations.

The Faith G. Bemis Scholarships — To assist girls with records of superior scholastic achievement who are in need of financial aid; named in honor of Mrs. Albert F. Bemis, a loyal friend of the University.

The Clara Ford Scholarships — To aid outstanding girls who might otherwise be unable to attend college; established in honor of Mrs. Joseph F. Ford, a bene-factress of Northeastern.

The Fred R. Hayward Scholarships — Granted on a competitive basis to young women of promise who would otherwise be unable to meet the expense of the freshman year, in memory of Mr. Hayward by his wife.

The Lillian Jane Kerr Scholarships — To able and needy girls, in the name of Mrs. Harry H. Kerr, because of her interest in making available educational opportunities under the Co-operative Plan.

The Cora E. Richards Scholarships — In memory of Mrs. James L. Richards, for worthy girls dependent chiefly upon their own efforts in securing a college education.

The Bertha J. Richardson Scholarships — To girls of demonstrated ability and established need, in appreciation of the loyal support of Mrs. Frank L. Richardson.

The Northeastern Faculty Wives Scholarship — Offered by the Faculty Wives of Northeastern University; to a girl of limited financial resources who has demon-strated a likelihood of succeeding in her chosen field.

R.O.T.C. Scholarships

Northeastern University Reserve Officers Training Corps Scholarships for Leadership, Ability and Outstanding Achievement in Military and Academic Studies.   Four fifty dollar scholarships awarded to the outstanding R.O.T.C. cadets in the basic program.

The M.K.M. Scholarships

Established in 1953.   The M.K.M. Knitting Mills, Incorporated, Manchester, New Hampshire, offers annually two scholarships in the amount of $250.00 each to employees of the Company, to sons and daughters of employees, and to high school seniors residing in Hillsboro County, New Hampshire.   Scholarship recipients will be expected to complete at least three work periods with M.K.M. Knitting Mills, Inc., or one of its subsidiaries.   The purpose of these scholar-ships is to provide an opportunity for qualified students to further their educa-tion in the fields of Mechanical Engineering or Business Administration, and to help prepare these students for supervisory and executive positions in the knitting industry.

The Sheffield Corporation Scholarships

Established in 1953.   The Sheffield Corporation of Dayton, Ohio, offers annu-ally a number of Northeastern University scholarships to employees of the Com-pany and its subsidiaries, sons and daughters of employees, and high school seniors residing in Franklin County, Massachusetts.   Each scholarship is in the amount of $1,200.00. Recipients are expected to complete at least three work periods with the Sheffield Corporation's subsidiary plants in Conway and Green-field, Massachusetts.   The purpose of the Sheffield Scholarship Plan is to provide an opportunity for young men and women to further their education in the fields

of Mechanical and Industrial Engineering and to train them for positions in the Precision Tool and Gage Manufacturing industry.

Roland Guyer Porter Memorial Fund

This Fund was established in 1953 by colleagues and friends of the late Professor R. G. Porter, for many years Head of the Department of Electrical Engineering. Interest on the Fund provides an annual award to a student in the Department of Electrical Engineering who best exemplifies the qualities of mind and character which Professor Porter did so much to develop in his lifetime.

The Alumni Association

The 10,000 alumni of the Day Colleges are organized to promote the welfare of Northeastern University and to perpetuate the spirit of fellowship among members of the Alumni Association. Headquarters of the Association are in the Alumni Office located in Room 251 of Richards Hall where records and addresses of alumni are on file.

The official publication is the *Northeastern Alumnus* which is published quarterly and is sent to all subscribers to the annual Alumni Fund. The Alumni Fund operates similar to the Community Chest. Once a year the alumni are solicited through the Alumni Association. The funds are used to provide an annual gift to the University, finance the activities of the Alumni Association, and publish the *Alumnus*.

Regional Alumni Clubs have been established in Brockton, Chicago, Cleveland, Connecticut, Detroit, Maine, New Hampshire, New York, Merrimac Valley, North Shore, Southern California, Southeastern Massachusetts, Philadelphia, Tri-City (Albany area), Western New York, Western Pennsylvania, South Shore, Washington-Baltimore, Western Massachusetts and Worcester. These clubs meet periodically in their respective centers to discuss matters pertaining to the University and its alumni. Meetings are also held in conjunction with the visits of Northeastern athletic teams to the various club centers.

The Association presents annually, at the Alumni Convocation, the Alumni Award for professional promise to a senior in each of the four Day Colleges.

The climax of the year's activities is the Alumni Federation Day held in conjunction with the June Commencement. Reunions of various classes are also conducted during Commencement week end.

The Alumni Association of the Day Colleges is a member of the Alumni Federation, which consists of the Alumni Associations of the Day Colleges, of the School of Business, and of the School of Law.

The organization of the Alumni Association is as follows:

Officers

President	*Vice-President*
JOHN W. LaBELLE '32	JAMES F. JEFFERSON '43
Secretary	*Treasurer*
ALBERT E. JOHNSON '32	JOHN E. VADALA '31

Executive Committee

JULIUS C. SANTIS '21	EDMOND L. SWEENEY '16
ALBERT J. OLIVA '30	JOSEPH M. CHRUSZ '37
HAROLD W. CRAFTS '24	WALTER J. WRIGHT '28

Alumni Council

MORTON S. PRATT '34, *Chairman*

LAWRENCE F. BLACKWELL '19
MARTIN BROWN '21
ARTHUR E. HARDING '22
HAROLD W. CRAFTS '24
FREDERICK P. STERN '25
ROGER DiCICCO '26
CHARLES L. RENKER '27
WALTER J. WRIGHT '28
V. GEORGE OHANESIAN '29
ALBERT J. OLIVA '30
ROBERT B. MATSON '31
EUGENE S. BLANCHARD '32
MORTON S. PRATT '34
STANLEY W. CRAMER '35
EUGENE J. VOGEL '36
HENRY F. ABBRUZZESE '37

IVAN G. EASTON '38
JOHN W. WILSON '39
JOHN J. GILL '40
ROY L. PARSONS, JR., '41
THOMAS A. LIKOS '42
AMBROSE NANGERONI '43
JOHN E. HURLEY '44
MERLE I. LOCKE '45
WILLIAM F. SULLIVAN '46
THOMAS L. McDONOUGH '47
FRANCIS J. MASTROPIERI '48
JOSEPH I. WEINREBE '49
CONSTANTINE G. COCKINOS '50A
LLOYD M. MARTON '50 CFT
KARL H. WEST '50C
DOUGLAS R. BRIGGS '51

ROBERT A. FLANNERY '52

Director of Alumni Relations

RUDOLF O. OBERG '26

THE
COLLEGE
OF EDUCATION

Admission Requirements and Courses of Study

1954–1955

(*COEDUCATIONAL*)

THE COLLEGE OF EDUCATION

General Objectives

THE WIDESPREAD ANXIETY, insecurity and confusion present in the world suggest a need for teachers who can guide students (1) in making sense in apparent chaos, (2) in defining and attacking urgent problems appropriate to their level of development, and (3) in mastering a variety of skills and insights for purposes of disciplining themselves and their relations with their total environment. Teachers today must know more about more things than ever before. In addition, they must be able to utilize such knowledge so that understanding grows into the nervous systems of students. Appropriate value judgments will then become an integrating aspect of living.

In order to achieve this, teachers in our elementary and secondary schools must be excellent examples of free men functioning in a free society, must be intelligent, emotionally controlled and flexible, healthy and creative. Teachers should like people without being emotionally dependent upon them. They must be convinced of the power of education and a teacher's value to society.

To prepare such teachers, Northeastern University will require (1) that a considerable portion of the student's time be devoted to a broad general education, (2) that a student know thoroughly his major field of study and (3) that he have a series of vital professional experiences before being declared competent to teach. Consistent with sound learning, best judgment and the established policy of the University, the College of Education will attempt to correlate in these professional experiences practice and theory.

It is the purpose of the College to adapt its programs to meet the individual needs of the students whom it serves and thus to contribute in a significant way to the increase in numbers and effectiveness of the teachers who will be needed for the education of the constantly growing school population.

This catalog deals chiefly with the undergraduate curricula of the College which are designed for young men and women coming directly from high school or returning from the armed services. Teachers who are interested in the graduate program may obtain the circular outlining these courses from the Dean of the College.

Admission Requirements

Applicants for admission to the freshman class must qualify by graduation from an accredited secondary school or the equivalent, including prescribed subjects listed on page 30.

Requirements for Graduation

Degrees

The College of Education will award the degree of Bachelor of Science in Education to those who successfully complete the four years of preparation for teaching at elementary or secondary school levels.

Quantitative Requirements

The required courses in each of the undergraduate curricula in the College of Education are indicated on the following pages. Each curriculum normally provides for not less than 200 credit hours of classwork in addition to the ten-week period of practice teaching required in the senior year. At least 36 credit hours of classwork will be required in Education.

Elective Courses

Elective courses, approved by the Dean of the College of Education, will be selected by the student from among courses in the Colleges of Liberal Arts and Business Administration.

Scholarship Requirements

Students who fail to show satisfactory standards of general efficiency in their professional fields may be required to demonstrate their qualifications for the degree by taking such additional work as the faculty may prescribe. Those who are clearly unable to meet the accepted standard of attainment will be required to withdraw from the University. The degree conferred not only represents the formal completion of the subjects in the selected course of study but also indicates professional competence in the designated field of specialization.

R.O.T.C. Students

All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credit hours. (See page 189 for details of the program.)

Graduation with Honors

Candidates who have achieved distinctly superior attainment in their academic work will be graduated with honor. Upon special vote of the faculty a limited number of this group may be graduated with high honor or with highest honor. Students must have been in attendance at the University at least three years before they may become eligible for honors at graduation.

Programs of Instruction

Students in the College of Education may choose a field of concentration in accordance with their particular interests and aptitudes. Specimen programs are shown on the pages which follow. These curricula are organized so that each student may acquire a comprehensive background in his field of specialization. Besides Elementary Education, students may select as majors the following secondary fields:

English, Social Studies, Science, Mathematics, Foreign Languages, Secretarial Science, Accounting, and the General Business Subjects, and Distributive Education.

The College of Education does not offer a major in Physical Education. However, students desiring to become teacher-coaches may elect a program which will provide them with a minor in this field.

Typical Curriculum in Elementary Education

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
23-01	West. Civ.	4	0	8	4
22-01	Am. Gov.	3	0	6	3
15-07	Surv. Sci.	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		16	2	32	16

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
23-02	West. Civ.	4	0	8	4
22-02	Am. Gov.	3	0	6	3
15-08	Surv. Sci.	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		16	2	32	16

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
23-03	West. Civ.	4	0	8	4
22-03	Am. Gov.	3	0	6	3
15-09	Surv. Sci.	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		16	2	32	16

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-04	English	5	0	10	2½
23-04	West. Civ.	4	0	8	2
15-10	Surv. Sci.	4	0	8	2
	Elective	3	0	6	1½
		16	0	32	8

SECOND YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-10	Int. to Ed.	4	0	8	4
30-05	Pub. Speak.	4	0	8	4
27-21	Theory of Drawing	1	2	0	2
10-06	Biol. & Soc.	3	0	6	3
	Elective	4	0	8	4
		16	2	30	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
26-06	Phys. Anth.	3	0	6	3
23-17	Am. Hist.	4	0	8	4
27-22	Pict. Draw. & Sketch.	1	2	0	2
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	2	30	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
26-07	Cult. Anth.	3	0	6	3
23-18	Am. Hist.	4	0	8	4
27-23	Past. and Water Color Pnt.	1	2	0	2
21-11	Prin. of Ed.	4	0	8	4
	Elective	4	0	8	4
		16	2	30	17

THIRD YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-12	Human Dev. I	3	0	6	3
21-30	Elem. Lang. Arts	3	0	6	3
21-34	Elem. Soc. St.	2	0	4	2
21-36	El. Cr. Arts	3	0	6	3
	Elective	4	0	8	4
		15	0	30	15

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
21-13	Human Dev. II	3	0	6	3
21-31	Read. in Elem. Schls.	4	0	8	4
21-32	Arithmetic	3	0	6	3
21-37	Cr. Arts	3	0	6	3
	Elective	4	0	8	4
		17	0	34	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
21-14	Human Dev. III	3	0	6	3
21-15	Lrng. & Tchg.	6	0	10	6
21-33	Tchg. Arith.	3	0	6	3
21-35	Elem. Sci.	2	0	4	2
		14	0	26	14

FOURTH YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-16	Lrng. & Cur.	6	0	10	6
	Elective	4	0	8	4
	Elective	3	0	6	3
	Elective	3	0	6	3
		16	0	30	16

TERM 2‡

No.	Course	Cl.	Lab.	Pr.	Cr.
21-40	Stud. Tchg.				8
21-41	Sem. in Tchg.				2
					10

TERM 4

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

*Summer term — 5 weeks.
†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.
‡May be scheduled in Term 2, 3, or 4 of Senior Year.

Typical Curriculum in Social Studies

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
23-01	West. Civ.	4	0	8	4
22-01	Am. Gov.	3	0	6	3
15-07	Surv. Sci.	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		16	2	32	16

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
23-02	West. Civ.	4	0	8	4
22-02	Am. Gov.	3	0	6	3
15-08	Surv. Sci.	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		16	2	32	16

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
23-03	West. Civ.	4	0	8	4
22-03	Am. Gov.	3	0	6	3
15-09	Surv. Sci.	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		16	2	32	16

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-04	English	5	0	10	2½
23-04	West. Civ.	4	0	8	4
15-10	Surv. Sci.	4	0	8	2
	Elective	3	0	6	1½
		16	0	32	8

SECOND YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-10	Int. to Ed.	4	0	8	4
10-05	Pub. Speak.	4	0	8	4
10-06	Biol. and Soc.	3	0	6	3
27-21	Theory of Drawing	1	2	0	2
	Elective	4	0	8	4
		16	2	30	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
23-17	Am. Hist.	4	0	8	4
26-01	Prin. of Soc.	4	0	8	4
26-06	Phys. Anth.	3	0	6	3
27-22	Pict. Draw. & Sketch.	1	2	0	2
	Elective	4	0	8	4
		16	2	30	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
23-18	Am. Hist.	4	0	8	4
26-02	Prin. of Soc.	4	0	8	4
21-11	Prin. of Ed.	4	0	8	4
27-23	Past.&Water Color Pt.	1	2	0	2
26-07	Cult. Anth.	3	0	6	3
		16	2	30	17

THIRD YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-12	Human Dev. I	3	0	6	3
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		15	0	30	15

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
21-13	Human Dev. II	3	0	6	3
22-11	For. Gov.	4	0	8	4
23-11	Eur. Hist.	4	0	8	4
	Elective	4	0	8	4
		15	0	30	15

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
21-14	Human Dev. III	3	0	6	3
22-12	For. Gov.	4	0	8	4
23-12	Eur. Hist.	4	0	8	4
21-15	Learning & Teaching	6	0	10	6
		17	0	32	17

FOURTH YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-16	Lrng. & Cur. Tchng. H. S. Soc. St.	6	0	10	6
		3	0	6	3
	Elective	4	0	8	4
	Elective	4	0	8	4
		17	0	32	17

TERM 2‡

No.	Course	Cr.
21-40	Stud. Tchng.	8
21-41	Sem. in Tchng.	2
		10

TERM 4

Course	Cl.	Lab.	Pr.	Cr.
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	16	0	32	16

TERM 3

Course	Cl.	Lab.	Pr.	Cr.
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	16	0	32	16

Summer term — 5 weeks.

All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

May be scheduled in Term 2, 3, or 4 of Senior Year.

Typical Curriculum in Teaching of English

FIRST YEAR†

TERM 1				
No. Course	Cl.	Lab.	Pr.	Cr.
30-01 English	3	0	6	3
23-01 West. Civ.	4	0	8	4
22-01 Am. Gov.	3	0	6	3
15-07 Surv. Sci.	3	0	6	3
16-10 Phys. Tr.	0	2	0	0
Elective	3	0	6	3
	16	2	32	16

TERM 2				
No. Course	Cl.	Lab.	Pr.	Cr.
30-02 English	3	0	6	3
23-02 West. Civ.	4	0	8	4
22-02 Am. Gov.	3	0	6	3
15-08 Surv. Sci.	3	0	6	3
16-11 Phys. Tr.	0	2	0	0
Elective	3	0	6	3
	16	2	32	16

TERM 3				
No. Course	Cl.	Lab.	Pr.	Cr.
30-03 English	3	0	6	3
23-03 West. Civ.	4	0	8	4
22-03 Am. Gov.	3	0	6	3
15-09 Surv. Sci.	3	0	6	3
16-12 Phys. Tr.	0	2	0	0
Elective	3	0	6	3
	16	2	32	16

TERM 4*				
No. Course	Cl.	Lab.	Pr.	Cr.
30-04 English	5	0	10	2½
23-04 West. Civ.	4	0	8	2
15-10 Surv. Sci.	4	0	8	2
Elective	3	0	6	1½
	16	0	32	8

SECOND YEAR

TERM 1				
21-10 Int. to Ed.	4	0	8	4
30-35 Am. Lit.	4	0	8	4
30-05 Pub. Speak.	4	0	8	4
27-21 Theory of Drawing	1	2	0	2
10-06 Biol. & Soc.	3	0	6	3
	16	2	30	17

TERM 2				
23-17 Am. Hist.	4	0	8	4
30-33 Eng. Lit.	4	0	8	4
26-06 Phys. Anth.	3	0	6	3
27-22 Pict. Draw. & Sketch.	1	2	0	2
	12	2	22	13

TERM 3				
23-18 Am. Hist.	4	0	8	4
30-34 Eng. Lit.	4	0	8	4
26-07 Cult. Anth.	3	0	6	3
27-23 Past.&Water Color Pnt.	1	2	0	2
21-11 Prin. of Ed.	4	0	8	4
	16	2	30	17

THIRD YEAR

TERM 1				
21-12 Human Dev. I	3	0	6	3
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	15	0	30	15

TERM 2				
21-13 Human Dev. II	3	0	6	3
30-21 Inter. Writ.	4	0	8	4
30-61 Shakespeare	4	0	8	4
Elective	4	0	8	4
	15	0	30	15

TERM 3				
21-14 Human Dev. III	3	0	6	3
30-22 Inter. Writ.	4	0	8	4
30-61 Shakespeare	4	0	8	4
21-15 Lrng.&Tchg.	6	0	10	6
	17	0	32	17

FOURTH YEAR

TERM 1				
21-16 Lrng. & Cur.	6	0	10	6
Elective	4	0	8	4
Elective	4	0	8	4
Tchg. of H. S. English	3	0	6	3
	17	0	32	17

TERM 2‡				
21-40 Stud. Tchg.				8
21-41 Sem. in Tchg.				2
				10

TERM 3				
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	16	0	32	16

TERM 4				
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	16	0	32	16

*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

‡May be scheduled in Term 2, 3, or 4 of Senior Year.

Typical Curriculum in Teaching of Modern Languages

FIRST YEAR†

	TERM 1						TERM 2						TERM 3			
No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3	30-02	English	3	0	6	3	30-03	English	3	0	6	3
23-01	West. Civ.	4	0	8	4	23-02	West. Civ.	4	0	8	4	23-03	West. Civ.	4	0	8	4
22-01	Am. Gov.	3	0	6	3	22-02	Am. Gov.	3	0	6	3	22-03	Am. Gov.	3	0	6	3
15-07	Surv. Sci.	3	0	6	3	15-08	Surv. Sci.	3	0	6	3	15-09	Surv. Sci.	3	0	6	3
16-10	Phys. Tr.	0	2	0	0	16-11	Phys. Tr.	0	2	0	0	16-12	Phys. Tr.	0	2	0	0
	Lang. Elec.	3	0	6	3		Lang. Elec.	3	0	6	3		Lang. Elec.	3	0	6	3
		16	2	32	16			16	2	32	16			16	2	32	16

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-04	English	5	0	10	2½
23-04	West. Civ.	4	0	8	2
15-10	Surv. Sci.	4	0	8	2
	Elective	3	0	6	1½
		16	0	32	8

SECOND YEAR

	TERM 1						TERM 2						TERM 3			
21-10	Int. to Ed.	4	0	8	4	26-01	Prin. of Soc.	4	0	8	4	21-11	Prin. of Ed.	4	0	8	4
30-05	Pub. Speak.	4	0	8	4	23-17	Am. Hist.	4	0	8	4	23-18	Am. Hist.	4	0	8	4
30-06	Biol. & Soc.	3	0	6	3	30-33	Eng. Lit.	4	0	8	4	30-34	Eng. Lit.	4	0	8	4
27-21	Theory of Drawing	1	2	0	2	27-22	Pict. Draw. & Sketch.	1	2	0	2	27-23	Past.&Water Color Pnt.	1	2	0	2
	Elective	4	0	8	4		Lang. Elec.	4	0	8	4		Lang. Elec.	4	0	8	4
		16	2	30	17			17	2	32	18			17	2	32	18

THIRD YEAR

	TERM 1						TERM 2						TERM 3			
21-12	Human Dev. I	3	0	6	3	21-13	Human Dev. II	3	0	6	3	21-14	Human Dev. III	3	0	6	3
	Elective	4	0	8	4		Lang. Elec.	4	0	8	4	21-15	Lrng.&Tchg.	6	0	10	6
	Elective	4	0	8	4		Lang. Elec.	4	0	8	4		Lang. Elec.	4	0	8	4
	Elective	4	0	8	4		Elective	4	0	8	4		Lang. Elec.	4	0	8	4
		15	0	30	15			15	0	30	15			17	0	32	17

FOURTH YEAR

	TERM 1				
21-16	Lrng. & Cur.	6	0	10	6
21-21	Tchg. H. S. Lang. Arts	3	0	6	3
	Elective	4	0	8	4
	Elective	4	0	8	4
		17	0	32	17

	TERM 2‡	
21-40	Student Tchg.	8
21-41	Sem. in Tchg.	2
		10

	TERM 3				
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

	TERM 4				
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

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*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

‡May be scheduled in Term 2, 3, or 4 of Senior Year.

Typical Curriculum in Teaching of Mathematics

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
11-01	Gen. Chem.	3	3	6	4
14-01	Col. Alg.	5	0	7	4
15-01	Physics	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		17	5	31	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
11-02	Gen. Chem.	3	3	6	4
14-02	Trig.	5	0	7	4
15-02	Physics	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		17	5	31	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
11-03	Gen. Chem.	3	3	6	4
14-03	Anal. Geom.	5	0	10	5
15-03	Physics	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
	Elective	3	0	6	3
		17	5	34	18

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
11-04	Gen. Chem.	3	3	6	2
14-04	Intro. to Calc.	5	0	10	2½
15-04	Physics	3	0	6	1½
	Elective	3	0	6	1½
		14	3	28	7½

SECOND YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-10	Int. to Ed.	4	0	8	4
30-05	Pub. Speak.	4	0	8	4
10-06	Biol. & Soc.	3	0	6	3
27-21	Theory of Drawing	1	2	0	2
	Elective	4	0	8	4
		16	2	30	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
14-05	Diff. Calc.	4	0	8	4
15-05	Physics	3	3	6	4
26-06	Phys. Anth.	3	0	6	3
27-22	Pict. Draw. & Sketch.	1	2	0	2
	Elective	4	0	8	4
		15	5	28	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
14-06	Int. to Calc.	4	0	8	4
15-06	Physics	3	3	6	4
26-07	Cult. Anth.	3	0	6	3
27-23	Past. & Water Color Pnt.	1	2	0	2
21-11	Prin. of Ed.	4	0	8	4
		15	5	28	17

THIRD YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-12	Human Dev. I	3	0	6	3
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		15	0	30	15

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
21-13	Human Dev. II	3	0	6	3
14-07	Diff. Eq. I	4	0	5	3
	Elective	4	0	8	4
	Elective	4	0	8	4
		15	0	27	14

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
21-14	Human Dev. III	3	0	6	3
14-18	Theo. Eq.	4	0	8	4
21-15	Lrng. & Tchg.	6	0	10	6
	Elective	4	0	8	4
		17	0	32	17

FOURTH YEAR

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
21-16	Lrng. & Cur.	6	0	10	6
21-23	Tchg. H. S. Math.	3	0	6	3
	Elective	4	0	8	4
	Elective	4	0	8	4
		17	0	32	17

TERM 2‡

No.	Course	Cl.	Lab.	Pr.	Cr.
21-40	Student Tchg.				8
21-41	Sem. in Tchg.				2
					10

TERM 3

Course	Cl.	Lab.	Pr.	Cr.
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	16	0	32	16

TERM 4

Course	Cl.	Lab.	Pr.	Cr.
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	16	0	32	16

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*Summer term — 5 weeks.

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‡May be scheduled in Term 2, 3, or 4 of Senior Year.

Typical Curriculum in Teaching of Science

FIRST YEAR†

TERM 1					TERM 2					TERM 3				
No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.
30-01 English	3	0	6	3	30-02 English	3	0	6	3	30-03 English	3	0	6	3
11-01 Gen. Chem.	3	3	6	4	11-02 Gen. Chem.	3	3	6	4	11-03 Gen. Chem.	3	3	6	4
14-01 Col. Alg.	5	0	7	4	14-02 Trig.	5	0	7	4	14-03 Anal. Geom.	5	0	10	5
15-01 Physics	3	0	6	3	15-02 Physics	3	0	6	3	15-03 Physics	3	0	6	3
16-10 Phys. Tr.	0	2	0	0	16-11 Phys. Tr.	0	2	0	0	16-12 Phys. Tr.	0	2	0	0
Elective	3	0	6	3	Elective	3	0	6	3	Elective	3	0	6	3
	17	5	31	17		17	5	31	17		17	5	34	18

TERM 4*				
No. Course	Cl.	Lab.	Pr.	Cr.
11-04 Gen. Chem.	3	3	6	2
14-04 Intro. to Calc.	5	0	10	2½
15-04 Physics	3	0	6	1½
Elective	3	0	6	1½
	14	3	28	7½

SECOND YEAR

TERM 1					TERM 2					TERM 3				
21-10 Int. to Ed.	4	0	8	4	14-05 Diff. Calc.	4	0	8	4	14-06 Int. to Calc.	4	0	8	4
30-05 Pub. Speak.	4	0	8	4	15-05 Physics	3	3	6	4	15-06 Physics	3	3	6	4
10-01 Gen. Biol.	2	3	4	3	10-02 Gen. Biol.	2	3	4	3	10-03 Gen. Biol.	2	3	4	3
27-21 Theory of Drawing	1	2	0	2	27-22 Pict. Draw. & Sketch.	1	2	0	2	27-23 Past. & Water Color Pnt.	1	2	0	2
Elective	4	0	8	4	Elective	4	0	8	4	21-11 Prin. of Ed.	4	0	8	4
	15	5	28	17		14	8	26	17		14	8	26	17

THIRD YEAR

TERM 1					TERM 2					TERM 3				
21-12 Human Dev. I	3	0	6	3	21-13 Human Dev. II	3	0	6	3	21-14 Human Dev. III	3	0	6	3
Elective	4	0	8	4	10-55 Comp. Anat.	3	3	6	4	10-56 Comp. Anat.	3	3	6	4
Elective	4	0	8	4	11-17 Quant. Anal.	3	3	6	4	11-18 Quant. Anal.	3	3	6	4
Elective	4	0	8	4	Elective	4	0	8	4	21-15 Lrng. & Tchg.	6	0	10	6
	15	0	30	15		13	6	26	15		15	6	28	17

FOURTH YEAR

TERM 1					TERM 2‡					TERM 3				
21-16 Lrng. & Cur.	6	0	10	6	21-40 Student Tchg.				8	Elective	4	0	8	4
21-22 Tchg. H. S. Science	3	0	6	3	21-41 Sem. in Tchg.				2	Elective	4	0	8	4
Elective	4	0	8	4						Elective	4	0	8	4
Elective	4	0	8	4						Elective	4	0	8	4
	17	0	32	17					10		16	0	32	16

TERM 4				
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	16	0	32	16

*Summer term — 5 weeks.
†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.
‡May be scheduled in Term 2, 3, or 4 of Senior Year.

Typical Curriculum in Teaching of Accounting and General Business Subjects §

FIRST YEAR†

TERM 1					TERM 2					TERM 3				
No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.
30-01 English	3	0	6	3	30-02 English	3	0	6	3	30-03 English	3	0	6	3
27-11 Hist. Civ.	4	0	8	4	27-12 Hist. Civ.	4	0	8	4	27-13 Hist. Civ.	4	0	8	4
22-01 Am. Gov.	3	0	6	3	22-02 Am. Gov.	3	0	6	3	22-03 Am. Gov.	3	0	6	3
41-01 Prin. of Acct.	4	0	8	4	41-02 Prin. of Acct.	4	0	8	4	41-03 Prin. of Acct.	4	0	8	4
47-01 Typing I	3	0	6	3	47-02 Typing II	3	0	6	3	47-13 Adv. Typing	3	0	6	3
16-10 Phys. Tr.	0	2	0	0	16-11 Phys. Tr.	0	2	0	0	16-12 Phys. Tr.	0	2	0	0
	17	2	34	17		17	2	34	17		17	2	34	17

TERM 4*

No. Course	Cl.	Lab.	Pr.	Cr.
30-04 English	5	0	10	2½
27-14 Hist. Civ.	4	0	8	2
23-05 Am. Hist.	6	0	12	3
	15	0	30	7½

SECOND YEAR

TERM 1					TERM 2					TERM 3				
20-13 Econ. Prin.	4	0	8	4	41-25 Prin. Acct.	4	0	8	4	41-27 Acct. Stat.	4	0	8	4
20-05 Econ. Geog.	4	0	8	4	43-21 Prin. Mktg.	3	0	6	3	43-22 Prin. Advt.	3	0	6	3
26-01 Prin. of Soc.	4	0	8	4	21-10 Int. to Ed.	4	0	8	4	21-11 Prin. of Ed.	4	0	8	4
45-21 Prin. of Bus. Mgt.	3	0	6	3	44-20 Int. to Fin.	3	0	6	3	45-22 Ind. Mgt.	3	0	6	3
27-21 Theory of Drawing	1	2	0	2	27-22 Pict. Draw. & Sketch.	1	2	0	2	27-23 Past.&Water Color Pnt.	1	2	0	2
	16	2	30	17		15	2	28	16		15	2	28	16

THIRD YEAR

TERM 1					TERM 2					TERM 3				
21-12 Human Dev. I	4	0	8	4	21-13 Human Dev. II	4	0	8	4	21-14 Human Dev. III	4	0	8	4
20-18 Am.Ec.Hist.	4	0	8	4	45-33 Mgt. Prob.	3	0	6	3	43-52 Ret. Merch.	4	0	8	4
46-41 Bus. Law I	4	0	8	4	43-30 Salesmanship	3	0	6	3	20-15 Econ. Prob.	4	0	8	4
Elective	4	0	8	4	20-14 Econ. Prob.	4	0	8	4	21-15 Lrng.&Tchg.	6	0	10	6
					30-08 Bus. Comm.	3	0	6	3					
	16	0	32	16		17	0	34	17		18	0	34	18

FOURTH YEAR

TERM 1					TERM 2‡					TERM 3				
21-16 Lrng. & Cur.	6	0	10	6	21-40 Student Tchg.				8	Elective	4	0	8	4
21-26 Tchg. Gen. Bus.	3	0	6	3	21-41 Sem. in Tchg.				2	Elective	4	0	8	4
Elective	4	0	8	4						Elective	4	0	8	4
Elective	4	0	8	4						Elective	4	0	8	4
	17	0	32	17					10		16	0	24	16

TERM 4

Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
Elective	4	0	8	4
	16	0	32	16

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*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

‡May be scheduled in Term 2, 3, or 4 of Senior Year.

§Programs also available in Secretarial Science and Distributive Education.

NORTHEASTERN UNIVERSITY

COLLEGE OF

LIBERAL ARTS

Admission Requirements and Courses of Study

1954–1955

(*COEDUCATIONAL*)

BOSTON 15, MASSACHUSETTS

January, 1954

THE COLLEGE OF LIBERAL ARTS

Aims

IN PROVIDING the means to a modern liberal education the College of Liberal Arts of Northeastern University has a threefold objective: first, the development of intellectual capability; second, the development of a well-rounded personality; and third, preparation for a vocation.

Intellectual capability rests upon the foundation of a sound general education. Through the required and elective courses of all curricula, students are guided toward a mastery of the leading ideas, significant facts, and the habits of thought and methods of work in the areas of language, natural science, social science, and the humanities. With this training the student will better understand the world and society in which he lives, appreciate more fully the basic values upon which civilization and culture rest, and perceive and accept his responsibilities as an active participant in social groups — the family, the community, the nation, and the world. At the same time the student is aided in the development of a resourceful and independent mind, the ability to use as well as to accumulate knowledge, and the awareness of his mental strengths and weaknesses.

The College of Liberal Arts endeavors to aid each student in attaining the goal of an emotionally balanced, well-rounded personality. Through its academic, extracurricular, and co-operative work programs, students are provided experiences which will be conducive to the development of strength of character and a sense of personal responsibility — including such personal qualities as self-reliance, integrity, perseverance, and the ability to work with others.

Since liberal arts colleges were originally established for the purpose of training for certain professions, the College of Liberal Arts holds that there is no inconsistency between a truly liberal education and preparation for a vocation. Today it is widely accepted that a liberal education must prepare both for the art of living and the obtaining of a living. Through its academic program coupled with co-operative work experience the College of Liberal Arts aims at providing young men and women with a sound training either for further graduate study or for immediate entrance upon graduation into some vocation.

Methods

To enable each student to plan a college program in keeping with his own interests and aptitudes, a wide range of electives is offered. This does not mean that students are free to elect courses indiscriminately, for if they are to obtain a liberal education they must have training in several basic fields. Therefore, a definite series of basic courses in each curriculum is required by the faculty. These required courses are largely concentrated in the first two years of the curriculum.

Through a comprehensive guidance program students are directed in their selection of courses so that they obtain the proper preparation for their intended vocations. Specialization in a major field is emphasized during the latter part of the curriculum and is facilitated by the opportunity for electing certain courses in the College of Engineering and the College of Business Administration.

Through the Northeastern plan of co-operative education for upperclassmen,

the student makes early contact with actual working conditions and profits by the wholesome experience of earning at least part of the money to defray college expenses. Viewed as a whole, then, the college years surround the student not with an artificial atmosphere of cloistered scholarship but with an environment very close to that which he or she will enter after graduation, and thus tend to make for more ready employment, an essential element of vocational competence.

Evening Division

In order to provide employed men and women with opportunities in liberal arts education, a number of the regular courses are offered during the evening. These courses are designed for three groups of young men and women who are secondary school graduates and qualified for entrance to the college: (1) those who wish to prepare for admission to a School of Law; (2) those who wish to pursue a cultural program leading to the degree of Associate in Arts; (3) those who do not wish to follow a specific program but desire to take courses to improve their cultural background.

The evening courses are arranged in a three-year program which meets one-half the credit hour requirement for the A.B. or S.B. degree and leads to the degree of Associate in Arts.

Preparation for a Career

The curricula in the College of Liberal Arts afford not only a broad cultural training but also the necessary foundation for a wide range of vocations for both young men and young women. Some of the career opportunities open to the graduates of the College of Liberal Arts together with the academic programs needed are indicated below and in the pages which follow.

Art — The courses in art provide a liberal education in the history of art, and train men and women for professional work in industrial drafting and tracing, advertising design, commercial art, or teaching, dependent upon the nature of the elected program. An appreciation of art is developed through progressive courses in art history which includes studies of materials, techniques, and methods used by master craftsmen. Paralleling these academic studies, courses in applied art provide adequate training for employment in engineering drafting rooms or commercial art studios.

Business — The value of a liberal arts preparation for a business career is clearly shown by the fact that a very large proportion of all graduates of liberal arts colleges enter business. Within recent years there has arisen an increasing demand for liberal arts graduates by the largest and most progressive corporations in the country. For their training programs in manufacturing, merchandising, selling and other fields many companies are seeking adaptable young men and women with the breadth of background of a liberal arts education.

Students planning either to go to a graduate school of business administration or to enter business directly upon graduation should major in economics and should elect courses in English, government, and psychology. A limited number of specialized courses in the College of Business Administration such as advertising, business law, finance, industrial management, insurance, investments, marketing, and merchandising may be taken by students who have had the necessary prerequisites.

Biological Sciences — Students who major in biology can arrange programs which will lay the foundation for the following careers: teaching, dentistry, medicine (see premedical curriculum), veterinary medicine, public health, sanitation and laboratory methods; research in biology with universities, private research institutions, and governmental agencies under state and federal control; agriculture; and professional work in zoology and its applied fields such as fisheries, animal husbandry, and biology survey. Graduate study is essential for most of these careers.

Chemistry — The subject matter of the chemistry curriculum is composed of four broad fields: inorganic chemistry, analytical chemistry, organic chemistry, and physical chemistry. Chemists are employed in research, development, production, sales, market research, purchasing, and teaching. Women chemists find openings in some of these fields as well as in medical research and as technical librarians. Students who choose a chemistry major at Northeastern, a program accredited by the American Chemical Society, will be prepared to enter these fields upon graduation.

The same program provides a thorough foundation for those who wish to continue in graduate studies for a higher degree.

Dentistry — The minimum requirement for admission to dental schools is two years of preliminary study in an approved college. Since the requirements of individual dental schools vary, students should familiarize themselves with the specific requirements of the schools in which they are interested. For most dental schools a candidate for admission must offer at least one year of work in English, physics, and biology, and one and one-half years of work in chemistry, including organic chemistry.

Predental students at Northeastern will be able to meet these requirements by taking the two-year predental program. A third year may be taken by those students who desire to obtain a broader educational background, and who wish to qualify for the B.S. degree under the Combined Program described on page 67.

Government Service — Government service is a very comprehensive term since the numerous activities of modern government require all types of trained workers. For more and more of these positions a college education is essential as shown by the fact that only college graduates are eligible to take many civil service examinations in such fields as biology, business analysis, economics, editing, fiscal analysis, mathematics, physics, psychology, social work, sociology, and statistics.

The distinctive governmental career field is that of public administration since the need for college trained personnel in administrative governmental posts of all types, political or nonpolitical, is being increasingly recognized. While graduate training is desirable, an undergraduate program with a major in history-government and a minor in economics will provide the necessary foundation for a career in government service at home or abroad.

Journalism — Many of the nation's leading editors now advise students preparing for a career in journalism to obtain a broad liberal arts education rather than to concentrate on specific training in the routines of journalism in their undergraduate programs. It should be observed that opportunities in journalism today are not restricted to the urban or rural newspaper fields. Publishing houses,

trade journals, house organs, advertising departments and agencies, and the various types of public relations work need college graduates with the same basic training.

Students who desire to enter journalism should choose the English-journalism major with a minor in economics, history, or government. They may elect courses in advertising in the College of Business Administration.

Law — Approved law schools now require at least three years of acceptable college work for admission. Since admission requirements of law schools vary, all prelegal students should ascertain the specific requirements of the law school of their choice.

The prelegal curriculum listed on page 78 will prepare a student for admission to any law school requiring three years of college work. Under the combined program described on page 67 it is possible for most students to obtain both the A.B. and LL.B. degrees in six years.

Library Work — Professional training for library work now demands at least one year of graduate study in a library school following a broad undergraduate foundation in liberal arts. While a major in English is usually advised, many opportunities are available for those who have concentrated in other fields.

Mathematics — A recent bulletin of the United States Department of Labor lists the following occupational titles in fields other than teaching for those who have majored in mathematics: Actuarial statistician, actuary, computer, mathematical aide, mathematical assistant, mathematician, statistical clerk, and statistician. Opportunities for such positions are to be found in government service, insurance companies, and industry. For some types of mathematical work graduate study is necessary.

Medical Technology — To be eligible to take the examination for certification as a Medical Technologist by the Registry of Medical Technologists of the American Society of Clinical Pathologists a candidate must have completed a two-year college program including specified work in biology and chemistry prior to taking technical training in medical technology for at least twelve consecutive months in a school of medical technology approved by the Council on Medical Education and Hospitals of the American Medical Association.

The two-year program on page 80 has been approved by the Registry of Medical Technologists as meeting their requirements for basic college preparation although some hospital schools of medical technology require a third year of college preparation. Qualified candidates then enter a school of medical technology in an approved hospital and receive their technical training in biochemistry, hematology, bacteriology, parasitology, histology, serology, and other subjects. Upon the successful completion of this work the candidate is eligible to take the examination for certification as a Medical Technologist (M.T.) by the Registry of Medical Technologists, recognized as the authoritative qualifying body for this field.

Medicine — In order to be eligible for admission to a medical school according to the Committee on Education of the American Medical Association, a candidate must have attended an approved college and have included certain specific work in his program. The minimum course requirements include year courses in each of the following fields: English, inorganic chemistry, organic chemistry,

physics, and a foreign language. Since some medical schools impose additional requirements, premedical students should obtain full information from the medical school of their choice about the courses which must be offered for admission.

The premedical curriculum listed on page 79 will enable students to meet all the above standard requirements. The electives make it possible to obtain any particular additional courses required by some medical schools.

Students are cautioned that the successful completion of the required premedical program by no means ensures admission to a medical school. Since most medical schools have far more applicants than they can admit, standards of selection are most rigorous and take into consideration not only the quality of the applicant's academic record and instructor's recommendations but also his or her medical-aptitude test score and the results of a personal interview.

Premedical students should note the combined program described on page 67.

Ministry — Preparation for the ministry today requires a theological school training following graduation from an approved college of liberal arts. The American Association of Theological Schools states that the appropriate foundation for a minister's later professional studies lies in a broad and comprehensive college education and that the normal place for a minister's professional study is the theological school. Recommended fields of study include English, economics, education, government, history, foreign languages, one of the natural sciences, philosophy, psychology, and sociology.

While students who major in English, economics, psychology, or sociology will be able to arrange programs meeting the above recommendation, it is urged that preministerial students obtain counsel from the dean of the theological school of their choice since some schools have further specific requirements.

Modern Languages — A major in Modern Languages is available for those students who have obtained a strong foundation in one language (French, German or Spanish) in high school and begin a second one in the freshman year at college.

Besides secondary school teaching, there are other fields, such as certain branches of government service, international business relations, journalism, and library science, in which a knowledge of foreign languages is either required or desirable.

Physics — As a result of the rapid developments in physics in recent years, there are increasing opportunities in applied physics on the technical staffs and in the research laboratories of the electrical, electronics, radio, optical industries, and in many governmental research agencies for the liberal arts graduate who has majored in physics. Graduate study is necessary for those who plan on research in pure physics.

Psychology — There is an increasing demand for persons trained in psychology in a wide range of occupational fields. In the field of education the demand is expanding for school psychologists at the grade school level and for guidance workers and vocational counselors at the junior and senior high school level.

In the field of business and industry increasing numbers of psychologists are being employed in marketing research, in advertising, and in personnel departments. In state and federal governmental agencies clinical psychologists are em-

ployed in hospitals for the mentally ill, in child guidance clinics, in employment offices, and as research workers on problems relating to cultural relations with other countries, to propaganda, and to education.

A large number of these positions require that the applicant have at least one year of graduate work and not a few require that he or she have a Ph.D. degree.

Secretarial Work — Today there are excellent opportunities for college graduates, regardless of their majors, who can qualify for secretarial positions. A sequence of elective courses in secretarial studies is open to all students in the College of Liberal Arts who wish to prepare themselves for this avenue to advancement.

Sociology — Sociology majors find their undergraduate training of value, and are increasingly in demand in such important and interesting fields of work as college teaching, social work, social research projects, personnel work in business and industry, and government positions in a wide range of areas.

For those desiring to do further work in the first three fields, graduate training for at least one or two years is almost always required. For other fields of work, however, little or no graduate training is necessary.

Statistical Work — The growing emphasis upon statistics in business, education, social service, and government has opened a new career field for the student who majors in mathematics and obtains preparation in statistics. Similar training is necessary for students who wish to enter the actuarial field.

Teaching (Secondary School) — While a major in education is not offered in the College of Liberal Arts, a minor in this field is available, from courses offered by the College of Education, which meets the requirements of the Department of Education of the Commonwealth of Massachusetts for teachers in secondary schools. Students from other states should familiarize themselves with the requirements of their own state, as these requirements are constantly being increased.

Most small secondary schools, in which the graduate must begin, expect teachers to be able to teach at least two, and often three, subjects. Consequently programs should provide for the common combinations of related subjects. A major should be selected from the following fields: biology, chemistry, English, history-government, modern languages, or mathematics-physics.

Students who desire to become teacher-coaches may minor in physical education, provided they elect the required courses in education.

Teaching (College) — Students who plan to enter the college teaching profession will find that each of the major programs affords an excellent preparation for graduate study in the leading universities of the country. Since graduate schools usually require a reading knowledge of French or German, frequently both, students should elect adequate work in these languages. Seminar courses and thesis work are strongly recommended for their training in research techniques.

Admission Requirements

Applicants for admission to the freshman class must qualify by graduation from an approved course of study in an accredited secondary school, including prescribed subjects listed on page 31.

Requirements for Graduation

Degrees

The College of Liberal Arts awards the Bachelor of Arts degree to qualified candidates who have majored in economics, English, English-journalism, history and government, modern languages, psychology, or sociology.

The Bachelor of Science degree is awarded to qualified candidates who have majored in biology, chemistry, mathematics, physics, or have taken the pre-medical curriculum.

Quantity Requirements

Candidates for a degree must have completed one of the curricula listed on pages 69–82. Each curriculum normally provides for not less than 208 credit hours of work, including at least 48 credit hours of advanced work in a major field, and at least 24 credit hours of prescribed or elective upperclass courses in a related minor field.

All candidates for a degree must have satisfactorily completed in college one year of a modern foreign language above the elementary level.

Students who undertake co-operative work assignments must meet the requirements of the Department of Co-operative Work before they become eligible for their degrees.

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work immediately preceding graduation has been completed at Northeastern.

R.O.T.C. Students

All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Quality Requirements

Of the 208 or more credit hours required for a degree, at least 135 credit hours must have been completed with a grade of C or better.

Graduation with Honor

Candidates who have achieved distinctly superior attainment in their academic work will be graduated with honor. Upon special vote of the faculty a limited number of this group may be graduated with high honor or with highest honor. Students must have been in attendance at the University at least three years before they may become eligible for honors at graduation.

Graduate Study

Graduate work in biology and chemistry is offered to properly qualified students desiring to undertake advanced study leading to the degree of Master of Science. Candidates for admission to this program must be high ranking students who have completed, or will have completed prior to admission to the

graduate program, the requirements for the Bachelor of Science degree with major in biology or chemistry at an institution of recognized standing. At the present time the program is limited to teaching fellows at Northeastern University who are required to devote half time to instruction at the undergraduate level. The requirements for the Master's degree should be completed in two years.

Requirements for the Master of Science Degree

Candidates for the degree of Master of Science in biology or chemistry must have completed satisfactorily 48 credit hours of study beyond that required for the Bachelor's degree. Of these, at least 32 credit hours must be graduate courses in the major field, these credits including formal course work and a thesis. Sixteen credits may be earned in a graduate seminar, advanced undergraduate courses approved by the head of the department concerned, or a combination of both. Graduate students must obtain a grade of B or better in any undergraduate course taken for credit.

The thesis subject must be approved by the head of the department within four weeks of the date of registration for graduate study. Theses must be completed in the major field of study at least four weeks in advance of the date on which the degree is to be awarded. After the thesis has been completed, a written or oral comprehensive examination may be required at the discretion of the department concerned.

Individual programs of study must have the approval of the Director of Graduate Study, who also acts as registration officer for graduate students.

Evening curricula leading to the degrees of Master of Science in Chemistry and in Mathematics-Physics are also available.

Curricular Requirements

The following fields of study are approved as major fields in the College of Liberal Arts: biology, chemistry, economics, English, English-journalism, history and government, mathematics, modern languages, physics, premedical, psychology, and sociology. In addition, two-year programs are approved for predental, prelegal, and premedical technology students.

Students may elect their minor fields after consultation with their faculty advisers. In addition to the major fields listed above, the following subjects are available as minors: art, education, French, German, philosophy, physical education, and Spanish.

The required courses in each curriculum are indicated on the following pages. Upon petition to the faculty, substitutions may be permitted in exceptional cases when required by the specific vocational objective of the student.

During the last year students in all curricula are required to attend a series of meetings designed to prepare them for placement in specific positions in their chosen vocational field. Under expert guidance each student prepares a complete personnel record, studies himself or herself and the opportunities that are open, and works out a complete campaign for obtaining after-graduation employment.

Combined Program with Professional Schools

Students entering after September 1, 1953, who have completed before entering an approved professional school of dentistry, law, or medicine at least three-

quarters of the work required for the baccalaureate degree at Northeastern University of which at least two-thirds have been earned in residence here and who have fulfilled all other graduation requirements will be granted the bachelor of arts or the bachelor of science degree upon receipt of the professional degree. The residence requirement at Northeastern University must have been completed immediately prior to entrance into the professional school. Under this plan pre-professional students may reduce by one year the time ordinarily required for obtaining both degrees.

Four-Year Plan

Except for Pre-professional Programs, all curricula in the College of Liberal Arts are normally organized on the five-year Co-operative Plan which is the distinctive feature of Northeastern University.

However, in all majors except chemistry and physics, qualified students may be excused from the Co-operative Plan by the Dean and may complete the requirements for the degree in four years.

Biology Curriculum

FIRST YEAR†

	TERM 1	Cl.	Lab.	Pr.	Cr.		TERM 2	Cl.	Lab.	Pr.	Cr.		TERM 3	Cl.	Lab.	Pr.	Cr.
No.	Course					No.	Course					No.	Course				
30-01	English	3	0	6	3	30-02	English	3	0	6	3	30-03	English	3	0	6	3
11-01	Gen. Chem.	3	3	6	4	11-02	Gen. Chem.	3	3	6	4	11-03	Gen. Chem.	3	3	6	4
14-21	Basic Math.	3	0	6	3	14-22	Basic Math.	3	0	6	3	14-23	Basic Math.	3	0	6	3
10-01	Gen. Biol.	2	3	4	3	10-02	Gen. Biol.	2	3	4	3	10-03	Gen. Biol.	2	3	4	3
	Mod. Lang. Elective	3	0	6	3		Mod. Lang. Elective	3	0	6	3		Mod. Lang. Elective	3	0	6	3
16-10	Phys. Tr.	0	2	0	0	16-11	Phys. Tr.	0	2	0	0	16-12	Phys. Tr.	0	2	0	0
		14	8	28	16			14	8	28	16			14	8	28	16

SECOND YEAR

	TERM 4*	Cl.	Lab.	Pr.	Cr.		TERM 5	Cl.	Lab.	Pr.	Cr.		TERM 6	Cl.	Lab.	Pr.	Cr.
10-04	Gen. Biol.	3	3	6	2	10-55	Comp. Anat.	3	3	6	4	10-56	Comp. Anat.	3	3	6	4
11-04	Gen. Chem.	3	3	6	2	11-17	Quant. Anal.	3	3	6	4	11-18	Quant. Anal.	2	3	4	3
15-11	Gen. Phys.	6	0	12	3	15-12	Gen. Phys.	3	3	9	5	15-13	Gen. Phys.	3	3	9	5
	Mod. Lang. Elective	3	0	6	1½		Mod. Lang. Elective	4	0	8	4		Mod. Lang. Elective	4	0	8	4
		15	6	30	8½			13	9	29	17			12	9	27	16

THIRD YEAR

	TERM 7*	Cl.	Lab.	Pr.	Cr.		TERM 8	Cl.	Lab.	Pr.	Cr.		TERM 9	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4	10-40	Physiology	3	3	6	4	10-41	Physiology	3	3	6	4
	Elective	8	0	16	4	11-26	Org. Chem.	3	3	6	4	11-27	Org. Chem.	3	3	6	4
							Elective	4	0	8	4		Elective	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
		16	0	32	8			14	6	28	16			14	6	28	16

FOURTH YEAR

	TERM 10*	Cl.	Lab.	Pr.	Cr.		TERM 11	Cl.	Lab.	Pr.	Cr.		TERM 12	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4	10-61	Embryology	3	3	6	4	10-62	Embryology	3	3	6	4
	Elective	8	0	16	4	10-59	An. Histol.	3	3	6	4	10-60	An. Histol.	3	3	6	4
						11-28	Org. Chem.	3	6	6	5	11-45	Biol. Chem.	3	3	6	4
							Elective	4	0	8	4		Elective	4	0	8	4
		16	0	32	8			13	12	26	17			13	9	26	16

FIFTH YEAR

	TERM 13*	Cl.	Lab.	Pr.	Cr.		TERM 14	Cl.	Lab.	Pr.	Cr.		TERM 15	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4	10-20	Gen. Bact.	3	3	6	4	10-21	Gen. Bact.	3	3	6	4
	Elective	8	0	16	4	11-46	Biol. Chem.	3	3	6	4		Elective	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
		16	0	32	8			14	6	28	16			15	3	30	16

Summer term — 5 weeks.
All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Curriculum in Chemistry

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
11-01	Gen. Chem.	3	3	6	4
14-01	Coll. Alg.	5	0	7	4
15-01	Physics	3	0	6	3
32-01	El. German	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		17	5	31	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
11-02	Gen. Chem.	3	3	6	4
14-02	Trig.	5	0	7	4
15-02	Physics	3	0	6	3
32-02	El. German	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		17	5	31	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
11-03	Gen. Chem.	3	3	6	4
14-03	Anal. Geom.	5	0	10	5
15-03	Physics	3	0	6	3
32-03	El. German	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		17	5	34	18

SECOND YEAR

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
11-04	Gen. Chem.	3	3	6	2
14-04	Int. to Calc.	5	0	10	2½
15-04	Physics	3	0	6	1½
32-04	El. German	3	0	6	1½
		14	3	28	7½

TERM 5

No.	Course	Cl.	Lab.	Pr.	Cr.
11-10	Quant. Anal.	2	3	4	3
11-11	Qual. Anal.	2	3	4	3
14-05	Diff. Calc.	4	0	8	4
15-05	Physics	3	3	6	4
32-15	Inter. Ger.	4	0	8	4
		15	9	30	18

TERM 6

No.	Course	Cl.	Lab.	Pr.	Cr.
11-09	Inorg. Chem.	2	3	4	3
11-12	Quant. Anal.	2	3	4	3
14-06	Int. Calc.	4	0	8	4
15-06	Physics	3	3	6	4
32-16	Inter. Ger.	4	0	8	4
		15	9	30	18

THIRD YEAR

TERM 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

TERM 8

No.	Course	Cl.	Lab.	Pr.	Cr.
11-14	Quant. Anal.	3	6	6	5
14-07	Diff. Eq.	4	0	5	3
20-11	Economics	3	0	6	3
	Elective	4	0	8	4
		14	6	25	15

TERM 9

No.	Course	Cl.	Lab.	Pr.	Cr.
11-30	Phys. Chem.	4	3	8	5
11-15	Inst. Anal.	2	6	4	4
20-12	Economics	3	0	6	3
	Elective	4	0	8	4
		13	9	26	16

FOURTH YEAR

TERM 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

TERM 11

No.	Course	Cl.	Lab.	Pr.	Cr.
11-20	Org. Chem.	3	6	6	5
11-31	Phys. Chem.	4	4	7	5
15-14	Adv. Phys.	2	2	5	3
24-07	Philosophy or				
25-07	Psychology	3	0	6	3
		12	12	24	16

TERM 12

No.	Course	Cl.	Lab.	Pr.	Cr.
11-21	Org. Chem.	3	6	6	5
11-32	Phys. Chem.	4	4	7	5
15-15	Adv. Phys.	2	2	5	3
24-08	Philosophy or				
25-08	Psychology	3	0	6	3
		12	12	24	16

FIFTH YEAR

TERM 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

TERM 14

No.	Course	Cl.	Lab.	Pr.	Cr.
11-22	Org. Chem.	3	0	6	3
11-29	Ad. Or. Prep.	0	6	0	2
11-35	Ad. Phys. Ch.	3	3	6	4
11-41	Chem. Lit.	1	0	2	1
30-09	Rept. Writ.	3	0	6	3
	Elective	4	0	8	4
		14	9	28	17

TERM 15

No.	Course	Cl.	Lab.	Pr.	Cr.
11-23	Qual. Org. Anal. Lab.	0	9	0	3
11-24	Ad. Org. Ch.	3	0	6	3
11-36	Spec. Topics	3	0	6	3
30-07	Eff. Spkg.	3	0	6	3
	Elective	4	0	8	4
		13	9	26	16

*Summer term — 5 weeks.

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Curriculum in Economics

FIRST YEAR†

Term 1					Term 2					Term 3				
No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.
30-01 English	3	0	6	3	30-02 English	3	0	6	3	30-03 English	3	0	6	3
23-01 West. Civ.	4	0	8	4	23-02 West. Civ.	4	0	8	4	23-03 West. Civ.	4	0	8	4
22-01 Am. Gov.	3	0	6	3	22-02 Am. Gov.	3	0	6	3	22-03 Am. Gov.	3	0	6	3
15-07 Surv. Sci.	3	0	6	3	15-08 Surv. Sci.	3	0	6	3	15-09 Surv. Sci.	3	0	6	3
Mod. Lang. Elective	3	0	6	3	Mod. Lang. Elective	3	0	6	3	Mod. Lang. Elective	3	0	6	3
16-10 Phys. Tr.	0	2	0	0	16-11 Phys. Tr.	0	2	0	0	16-12 Phys. Tr.	0	2	0	0
	16	2	32	16		16	2	32	16		16	2	32	16

SECOND YEAR

Term 4*					Term 5					Term 6				
15-10 Surv. Sci.	4	0	8	2	20-05 Econ. Geog.	4	0	8	4	20-13 Econ. Prin.	4	0	8	4
23-04 West. Civ.	4	0	8	2	25-01 Int. Psych.	4	0	8	4	25-02 Gen. Psych.	4	0	8	4
Mod. Lang. Elective	3	0	6	1½	26-01 Prin. Soc.	4	0	8	4	26-02 Prin. Soc.	4	0	8	4
30-04 English	5	0	10	2½	Mod. Lang. Elective	4	0	8	4	Mod. Lang. Elective	4	0	8	4
	16	0	32	8		16	0	32	16		16	0	32	16

THIRD YEAR

Term 7*					Term 8					Term 9				
Elective	8	0	16	4	20-14 Econ. Prob.	4	0	8	4	20-15 Econ. Prob.	4	0	8	4
Elective	8	0	16	4	20-16 Acct. Prin.	3	2	7	4	20-17 Acct. Prin.	3	2	7	4
					Elective	4	0	8	4	Elective	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		15	2	31	16		15	2	31	16

FOURTH YEAR

Term 10*					Term 11					Term 12				
Elective	8	0	16	4	20-20 Statistics	3	2	7	4	20-21 Statistics	3	2	7	4
Elective	8	0	16	4	20-18 Am.Ec.Hist.	4	0	8	4	20-24 Mon. & Bk.	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		15	2	31	16		15	2	31	16

FIFTH YEAR

Term 13*					Term 14					Term 15				
Elective	8	0	16	4	20-25 Bus. Cycles	4	0	8	4	20-26 Labor Econ.	4	0	8	4
Elective	8	0	16	4	20-31 Ad.Ec.Theo.	4	0	8	4	20-32 Ad.Ec.Theo.	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		16	0	32	16		16	0	32	16

*Summer term — 5 weeks.
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Curriculum in English and English-Journalism

FIRST YEAR†

TERM 1					TERM 2					TERM 3				
No. Course	*Cl.*	*Lab.*	*Pr.*	*Cr.*	*No. Course*	*Cl.*	*Lab.*	*Pr.*	*Cr.*	*No. Course*	*Cl.*	*Lab.*	*Pr.*	*Cr.*
30-01 English	3	0	6	3	30-02 English	3	0	6	3	30-03 English	3	0	6	3
23-01 West. Civ.	4	0	8	4	23-02 West. Civ.	4	0	8	4	23-03 West. Civ.	4	0	8	4
22-01 Am. Gov.	3	0	6	3	22-02 Am. Gov.	3	0	6	3	22-03 Am. Gov.	3	0	6	3
15-07 Surv. Sci.	3	0	6	3	15-08 Surv. Sci.	3	0	6	3	15-09 Surv. Sci.	3	0	6	3
Mod. Lang.					Mod. Lang.					Mod. Lang.				
Elective	3	0	6	3	Elective	3	0	6	3	Elective	3	0	6	3
16-10 Phys. Tr.	0	2	0	0	16-11 Phys. Tr.	0	2	0	0	16-12 Phys. Tr.	0	2	0	0
	16	2	32	16		16	2	32	16		16	2	32	16

SECOND YEAR

TERM 4*					TERM 5					TERM 6				
15-10 Surv. Sci.	4	0	8	2	20-05 Econ. Geog.	4	0	8	4	20-13 Econ. Prin.	4	0	8	4
23-04 West. Civ.	4	0	8	2	23-17 Am. Hist.	4	0	8	4	23-18 Am. Hist.	4	0	8	4
Mod. Lang.					30-33 Engl. Lit.	4	0	8	4	30-34 Engl. Lit.	4	0	8	4
Elective	3	0	6	1½	Mod. Lang.					Mod. Lang.				
30-04 English	5	0	10	2½	Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		16	0	32	16		16	0	32	16

THIRD YEAR

TERM 7*					TERM 8					TERM 9				
Elective	8	0	16	4	30-21 Inter. Writ.	4	0	8	4	30-22 Inter. Writ.	4	0	8	4
Elective	8	0	16	4	26-01 Prin. Soc. or	4	0	8	4	26-02 Prin. Soc. or	4	0	8	4
					30-51 Int. Jour.	4	0	8	4	30-52 Int. Jour.	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		16	0	32	16		16	0	32	16

FOURTH YEAR

TERM 10*					TERM 11					TERM 12				
Elective	8	0	16	4	30-29 Found. Engl.					30-30 Found. Engl.				
Elective	8	0	16	4	Lang. or	4	0	8	4	Lang. or	4	0	8	4
					30-53 Tech.of Jour.	4	0	8	4	30-54 Tech.of Jour.	4	0	8	4
					30-35 Am. Lit.	4	0	8	4	30-36 Am. Lit.	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		16	0	32	16		16	0	32	16

FIFTH YEAR

TERM 13*					TERM 14					TERM 15				
Elective	8	0	16	4	30-43 19th Ct. Pr.	4	0	8	4	30-44 19th Ct. Pr.	4	0	8	4
Elective	8	0	16	4	30-61 Shakespeare	4	0	8	4	30-62 Shakespeare	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		16	0	32	16		16	0	32	16

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*Summer term — 5 weeks.

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Curriculum in History-Government

FIRST YEAR†

	TERM 1					TERM 2					TERM 3			
No.	Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3	30-02 English	3	0	6	3	30-03 English	3	0	6	3
23-01	West. Civ.	4	0	8	4	23-02 West. Civ.	4	0	8	4	23-03 West. Civ.	4	0	8	4
22-01	Am. Gov.	3	0	6	3	22-02 Am. Gov.	3	0	6	3	22-03 Am. Gov.	3	0	6	3
15-07	Surv. Sci.	3	0	6	3	15-08 Surv. Sci.	3	0	6	3	15-09 Surv. Sci.	3	0	6	3
	Mod. Lang.					Mod. Lang.					Mod. Lang.				
	Elective	3	0	6	3	Elective	3	0	6	3	Elective	3	0	6	3
16-10	Phys. Tr.	0	2	0	0	16-11 Phys. Tr.	0	2	0	0	16-12 Phys. Tr.	0	2	0	0
		16	2	32	16		16	2	32	16		16	2	32	16

SECOND YEAR

	TERM 4*					TERM 5					TERM 6			
15-10	Surv. Sci.	4	0	8	2	20-05 Econ. Geog.	4	0	8	4	20-13 Econ. Prin.	4	0	8	4
23-04	West. Civ.	4	0	8	2	23-17 Am. Hist.	4	0	8	4	23-18 Am. Hist.	4	0	8	4
	Mod. Lang.					30-33 Engl. Lit.	4	0	8	4	30-34 Engl. Lit.	4	0	8	4
	Elective	3	0	6	1½	Mod. Lang.					Mod. Lang.				
30-04	English	5	0	10	2½	Elective	4	0	8	4	Elective	4	0	8	4
		16	0	32	8		16	0	32	16		16	0	32	16

THIRD YEAR

	TERM 7*					TERM 8					TERM 9			
	Elective	8	0	16	4	22-11 For. Gov.	4	0	8	4	22-12 For. Gov.	4	0	8	4
	Elective	8	0	16	4	23-11 Eur. Hist.	4	0	8	4	23-12 Eur. Hist.	4	0	8	4
						Elective	4	0	8	4	Elective	4	0	8	4
						Elective	4	0	8	4	Elective	4	0	8	4
		16	0	32	8		16	0	32	16		16	0	32	16

FOURTH YEAR

	TERM 10*					TERM 11					TERM 12			
	Elective	8	0	16	4	22-13 Pol. Theory	4	0	8	4	22-14 Pol. Theory	4	0	8	4
	Elective	8	0	16	4	23-13 Engl. Hist.	4	0	8	4	23-14 Engl. Hist.	4	0	8	4
						Elective	4	0	8	4	Elective	4	0	8	4
						Elective	4	0	8	4	Elective	4	0	8	4
		16	0	32	8		16	0	32	16		16	0	32	16

FIFTH YEAR

	TERM 13*					TERM 14					TERM 15			
	Elective	8	0	16	4	22-20 Pub. Adm.	4	0	8	4	22-21 Pub. Adm.	4	0	8	4
	Elective	8	0	16	4	23-19 Lt. Am. His.	4	0	8	4	23-20 Lt. Am. His.	4	0	8	4
						Elective	4	0	8	4	Elective	4	0	8	4
						Elective	4	0	8	4	Elective	4	0	8	4
		16	0	32	8		16	0	32	16		16	0	32	16

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Curriculum in Mathematics

FIRST YEAR†

Term 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
11-01	Gen. Chem.	3	3	6	4
14-01	Coll. Alg.	5	0	7	4
15-01	Physics	3	0	6	3
	Mod. Lang. Elective	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		17	5	31	17

Term 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
11-02	Gen. Chem.	3	3	6	4
14-02	Trig.	5	0	7	4
15-02	Physics	3	0	6	3
	Mod. Lang. Elective.	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		17	5	31	17

Term 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
11-03	Gen. Chem.	3	3	6	4
14-03	Anal. Geom.	5	0	10	5
15-03	Physics	3	0	6	3
	Mod. Lang. Elective	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		17	5	34	18

SECOND YEAR

Term 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
11-04	Gen. Chem.	3	3	6	2
14-04	Int. to Calc.	5	0	10	2½
15-04	Physics	3	0	6	1½
	Mod. Lang. Elective	3	0	6	1½
		14	3	28	7½

Term 5

No.	Course	Cl.	Lab.	Pr.	Cr.
30-33	Engl. Lit.	4	0	8	4
14-05	Diff. Calc.	4	0	8	4
15-05	Physics	3	3	6	4
	Mod. Lang. Elective	4	0	8	4
		15	3	30	16

Term 6

No.	Course	Cl.	Lab.	Pr.	Cr.
30-34	Engl. Lit.	4	0	8	4
14-06	Int. Calc.	4	0	8	4
15-06	Physics	3	3	6	4
	Mod. Lang. Elective	4	0	8	4
		15	3	30	16

THIRD YEAR

Term 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

Term 8

No.	Course	Cl.	Lab.	Pr.	Cr.
14-07	Diff. Eq. I	4	0	5	3
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	29	15

Term 9

No.	Course	Cl.	Lab.	Pr.	Cr.
14-08	Diff. Eq. II	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

FOURTH YEAR

Term 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

Term 11

No.	Course	Cl.	Lab.	Pr.	Cr.
14-15	Adv. Calc.	4	0	8	4
14-09	Anal. Mech. I	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

Term 12

No.	Course	Cl.	Lab.	Pr.	Cr.
14-16	Adv. Calc.	4	0	8	4
14-10	Anal. Mech. II	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

FIFTH YEAR

Term 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

Term 14

No.	Course	Cl.	Lab.	Pr.	Cr.
14-17	Inf. Series	4	0	8	4
14-28	Prob. & Stat.	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

Term 15

No.	Course	Cl.	Lab.	Pr.	Cr.
14-18	Theo. Eq.	4	0	8	4
14-29	Math. of Stat.	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

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Curriculum in Modern Languages

FIRST YEAR†

Term 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
23-01	West. Civ.	4	0	8	4
22-01	Am. Gov.	3	0	6	3
15-07	Surv. Sci.	3	0	6	3
	Mod. Lang. Elective	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		16	2	32	16

Term 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
23-02	West. Civ.	4	0	8	4
22-02	Am. Gov.	3	0	6	3
15-08	Surv. Sci.	3	0	6	3
	Mod. Lang. Elective	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		16	2	32	16

Term 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
23-03	West. Civ.	4	0	8	4
22-03	Am. Gov.	3	0	6	3
15-09	Surv. Sci.	3	0	6	3
	Mod. Lang. Elective	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		16	2	32	16

SECOND YEAR

Term 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
15-10	Surv. Sci.	4	0	8	2
23-04	West. Civ.	4	0	8	2
	Mod. Lang. Elective	3	0	6	1½
30-04	English	5	0	10	2½
		16	0	32	8

Term 5

No.	Course	Cl.	Lab.	Pr.	Cr.
20-05	Econ. Geog.	4	0	8	4
23-17	Am. Hist.	4	0	8	4
30-33	Engl. Lit.	4	0	8	4
	Mod. Lang. Elective	4	0	8	4
		16	0	32	16

Term 6

No.	Course	Cl.	Lab.	Pr.	Cr.
20-13	Econ. Prin.	4	0	8	4
23-18	Am. Hist.	4	0	8	4
30-34	Engl. Lit.	4	0	8	4
	Mod. Lang. Elective	4	0	8	4
		16	0	32	16

THIRD YEAR

Term 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

Term 8

No.	Course	Cl.	Lab.	Pr.	Cr.
31-21	Fr. Lit.	4	0	8	4
32-21	Ger. Lit. or	4	0	8	4
33-21	Span. Lit.	4	0	8	4
31-17	Fr. Conv.	2	0	4	2
	Elective	4	0	8	4
	Elective	4	0	8	4
		18	0	36	18

Term 9

No.	Course	Cl.	Lab.	Pr.	Cr.
31-22	Fr. Lit.	4	0	8	4
32-22	Ger. Lit. or	4	0	8	4
33-22	Span. Lit.	4	0	8	4
31-18	Fr. Conv.	2	0	4	2
	Elective	4	0	8	4
	Elective	4	0	8	4
		18	0	36	18

FOURTH YEAR

Term 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

Term 11

No.	Course	Cl.	Lab.	Pr.	Cr.
31-23	Fr. Class.	4	0	8	4
32-23	Ger. Lit. or	4	0	8	4
33-23	Span. Lit.	4	0	8	4
32-17	Ger. Conv. or	2	0	4	2
33-17	Span. Conv.	2	0	4	2
	Elective	4	0	8	4
	Elective	4	0	8	4
		18	0	36	18

Term 12

No.	Course	Cl.	Lab.	Pr.	Cr.
31-24	Fr. Class.	4	0	8	4
32-24	Ger. Lit. or	4	0	8	4
33-24	Span. Lit.	4	0	8	4
32-18	Ger. Conv. or	2	0	4	2
33-18	Span. Conv.	2	0	4	2
	Elective	4	0	8	4
	Elective	4	0	8	4
		18	0	36	18

FIFTH YEAR

Term 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

Term 14

No.	Course	Cl.	Lab.	Pr.	Cr.
31-25	Fr. Rom.	4	0	8	4
32-25	Ger. Lit. or	4	0	8	4
33-25	Span. Lit.	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

Term 15

No.	Course	Cl.	Lab.	Pr.	Cr.
31-26	Fr. Rom.	4	0	8	4
32-26	Ger. Lit. or	4	0	8	4
33-26	Span. Lit.	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

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*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Curriculum in Physics

FIRST YEAR†

TERM 1					TERM 2					TERM 3				
No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.
30-01 English	3	0	6	3	30-02 English	3	0	6	3	30-03 English	3	0	6	3
11-01 Gen. Chem.	3	3	6	4	11-02 Gen. Chem.	3	3	6	4	11-03 Gen. Chem.	3	3	6	4
14-01 Coll. Alg.	5	0	7	4	14-02 Trig.	5	0	7	4	14-03 Anal. Geom.	5	0	10	5
15-01 Physics	3	0	6	3	15-02 Physics	3	0	6	3	15-03 Physics	3	0	6	3
Mod. Lang.					Mod. Lang.					Mod. Lang.				
Elective	3	0	6	3	Elective	3	0	6	3	Elective	3	0	6	3
16-10 Phys. Tr.	0	2	0	0	16-11 Phys. Tr.	0	2	0	0	16-12 Phys. Tr.	0	2	0	0
	17	5	31	17		17	5	31	17		17	5	34	18

SECOND YEAR

TERM 4*					TERM 5					TERM 6				
11-04 Gen. Chem.	3	3	6	2	30-33 Eng. Lit.	4	0	8	4	30-34 Eng. Lit.	4	0	8	4
14-04 Int. to Calc.	5	0	10	2½	14-05 Diff. Calc.	4	0	8	4	14-06 Int. Calc.	4	0	8	4
15-04 Physics	3	0	6	1½	15-05 Physics	3	3	6	4	15-06 Physics	3	3	6	4
Mod. Lang.					Mod. Lang.					Mod. Lang.				
Elective	3	0	6	1½	Elective	4	0	8	4	Elective	4	0	8	4
	14	3	28	7½		15	3	30	16		15	3	30	16

THIRD YEAR

TERM 7*					TERM 8					TERM 9				
Elective	8	0	16	4	15-16 Elect.& Mag.	3	0	6	3	15-24 Electronics	3	2	7	4
Elective	8	0	16	4	15-20 Optics	3	3	6	4	15-21 Optics	3	3	6	4
					14-07 Diff. Eq. I	4	0	5	3	14-08 Diff. Eq. II	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		14	3	25	14		14	5	29	16

FOURTH YEAR

TERM 10*					TERM 11					TERM 12				
Elective	8	0	16	4	15-26 Mod. Physics	4	0	8	4	15-27 Mod. Physics	4	0	8	4
Elective	8	0	16	4	15-25 Electronics	3	2	7	4	15-28 El. Instr.	2	4	6	4
					14-15 Adv. Calc.	4	0	8	4	14-16 Adv. Calc.	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		15	2	31	16		14	4	30	16

FIFTH YEAR

TERM 13*					TERM 14					TERM 15				
Elective	8	0	16	4	15-31 Nucl. Physics	3	0	6	3	15-32 Nucl. Physics	3	0	6	3
Elective	8	0	16	4	14-17 Inf. Series	4	0	8	4	14-18 Theo. Eq.	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
					Elective	4	0	8	4	Elective	4	0	8	4
	16	0	32	8		15	0	30	15		15	0	30	15

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*Summer term — 5 weeks.
†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Two-Year Predental Curriculum

FIRST YEAR†

TERM 1					TERM 2					TERM 3				
No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.
30-01 English	3	0	6	3	30-02 English	3	0	6	3	30-03 English	3	0	6	3
11-01 Gen. Chem.	3	3	6	4	11-02 Gen. Chem.	3	3	6	4	11-03 Gen. Chem.	3	3	6	4
14-21 Basic Math.	3	0	6	3	14-22 Basic Math.	3	0	6	3	14-32 Basic Math.	3	0	6	3
10-01 Gen. Biol.	2	3	4	3	10-02 Gen. Biol.	2	3	4	3	10-03 Gen. Biol.	2	3	4	3
Mod. Lang. Elective	3	0	6	3	Mod. Lang. Elective	3	0	6	3	Mod. Lang. Elective	3	0	6	3
16-10 Phys. Tr.	0	2	0	0	16-11 Phys. Tr.	0	2	0	0	16-12 Phys. Tr.	0	2	0	0
	14	8	28	16		14	8	28	16		14	8	28	16

SECOND YEAR

TERM 4*					TERM 5					TERM 6				
10-04 Gen. Biol.	3	3	6	2	10-55 Comp. Anat.	3	3	6	4	10-56 Comp. Anat.	3	3	6	4
11-04 Gen. Chem.	3	3	6	2	25-01 Int. Psych.	4	0	8	4	11-27 Org. Chem.	3	3	6	4
15-11 Gen. Phys.	6	0	12	3	15-12 Gen. Phys.	3	3	9	5	15-13 Gen. Phys.	3	3	9	5
Mod. Lang. Elective	3	0	6	1½	Mod. Lang. Elective	4	0	8	4	Mod. Lang. Elective	4	0	8	4
	15	6	30	8½		14	6	31	17		13	9	29	17

TERM 5-A				
10-40 Physiology	3	3	6	4
11-26 Org. Chem.	3	3	6	4
Eng. Elective	4	0	8	4
Elective	4	0	8	4
	14	6	28	16

NOTE: Predental students who wish to continue for a degree may be excused from the Co-operative Plan and may complete requirements for a degree in four years, or may take a third year to qualify for a degree under the Combined Program described on page 67.

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*Summer term — 5 weeks.
†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Prelegal Curriculum

FIRST YEAR†

No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
	TERM 1						**TERM 2**						**TERM 3**				
30-01	English	3	0	6	3	30-02	English	3	0	6	3	30-03	English	3	0	6	3
23-01	West. Civ.	4	0	8	4	23-02	West. Civ.	4	0	8	4	23-03	West. Civ.	4	0	8	4
22-01	Am. Gov.	3	0	6	3	22-02	Am. Gov.	3	0	6	3	22-03	Am. Gov.	3	0	6	3
15-07	Surv. Sci.	3	0	6	3	15-08	Surv. Sci.	3	0	6	3	15-09	Surv. Sci.	3	0	6	3
	Mod. Lang. Elective	3	0	6	3		Mod. Lang. Elective	3	0	6	3		Mod. Lang. Elective	3	0	6	3
16-10	Phys. Tr.	0	2	0	0	16-11	Phys. Tr.	0	2	0	0	16-12	Phys. Tr.	0	2	0	0
		16	2	32	16			16	2	32	16			16	2	32	16

SECOND YEAR

No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
	TERM 4*						**TERM 5**						**TERM 6**				
15-10	Surv. Sci.	4	0	8	2	20-05	Econ. Geog.	4	0	8	4	20-13	Econ. Prin.	4	0	8	4
23-04	West. Civ.	4	0	8	2	23-17	Am. Hist.	4	0	8	4	23-18	Am. Hist.	4	0	8	4
	Mod. Lang. Elective	3	0	6	1½	30-33	Engl. Lit.	4	0	8	4	30-34	Engl. Lit.	4	0	8	4
30-04	English	5	0	10	2½		Mod. Lang. Elective	4	0	8	4		Mod. Lang. Elective	4	0	8	4
		16	0	32	8			16	0	32	16			16	0	32	16

No.	Course	Cl.	Lab.	Pr.	Cr.
	TERM 5-A				
25-01	Intro. Psych.	4	0	8	4
26-01	Prin. Soc.	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

THIRD YEAR

No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
	TERM 8						**TERM 8-A**						**TERM 9**				
22-11	For. Gov.	4	0	8	4		Gov. Elect.	4	0	8	4	22-12	For. Gov.	4	0	8	4
23-13	Engl. Hist.	4	0	8	4		Hist. Elect.	4	0	8	4	23-14	Engl. Hist.	4	0	8	4
30-05	Pub. Speak.	4	0	8	4		Elective	4	0	8	4	30-06	Pub. Speak.	4	0	8	4
	Elective	4	0	8	4		Elective	4	0	8	4		Elective	4	0	8	4
							Elective	4	0	8	4						
		16	0	32	16			20	0	40	20			16	0	32	16

NOTE: Prelegal students who have completed the above program may qualify for the A.B. degree under the combined program described on page 67 or by continuing for a fourth year as a History-Government major.

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*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Premedical Curriculum

FIRST YEAR†

No.	Course	Cl.	Lab.	Pr.	Cr.
	TERM 1				
30-01	English	3	0	6	3
11-01	Gen. Chem.	3	3	6	4
14-21	Basic Math.	3	0	6	3
10-01	Gen. Biol.	2	3	4	3
	Mod. Lang.				
	Elective	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		14	8	28	16

No.	Course	Cl.	Lab.	Pr.	Cr.
	TERM 2				
30-02	English	3	0	6	3
11-02	Gen. Chem.	3	3	6	4
14-22	Basic Math.	3	0	6	3
10-02	Gen. Biol.	2	3	4	3
	Mod. Lang.				
	Elective	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		14	8	28	16

No.	Course	Cl.	Lab.	Pr.	Cr.
	TERM 3				
30-03	English	3	0	6	3
11-03	Gen. Chem.	3	3	6	4
14-23	Basic Math.	3	0	6	3
10-03	Gen. Biol.	2	3	4	3
	Mod. Lang.				
	Elective	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		14	8	28	16

SECOND YEAR

TERM 4*		Cl.	Lab.	Pr.	Cr.
10-04	Gen. Biol.	3	3	6	2
11-04	Gen. Chem.	3	3	6	2
15-11	Gen. Phys.	6	0	12	3
	Mod. Lang.				
	Elective	3	0	6	1½
		15	6	30	8½

TERM 5		Cl.	Lab.	Pr.	Cr.
10-55	Comp. Anat.	3	3	6	4
11-17	Quant. Anal.	3	3	6	4
15-12	Gen. Phys.	3	3	9	5
	Mod. Lang.				
	Elective	4	0	8	4
		13	9	29	17

TERM 6		Cl.	Lab.	Pr.	Cr.
10-56	Comp. Anat.	3	3	6	4
11-18	Quant. Anal.	2	3	4	3
15-13	Gen. Phys.	3	3	9	5
	Mod. Lang.				
	Elective	4	0	8	4
		12	9	27	16

THIRD YEAR

TERM 7*		Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

TERM 8		Cl.	Lab.	Pr.	Cr.
10-40	Physiology	3	3	6	4
11-26	Org. Chem.	3	3	6	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		14	6	28	16

TERM 9		Cl.	Lab.	Pr.	Cr.
10-41	Physiology	3	3	6	4
11-27	Org. Chem.	3	3	6	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		14	6	28	16

FOURTH YEAR

TERM 10*		Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

TERM 11		Cl.	Lab.	Pr.	Cr.
10-61	Embryology	3	3	6	4
11-28	Org. Chem.	3	6	6	5
	Elective	4	0	8	4
	Elective	4	0	8	4
		14	9	28	17

TERM 12		Cl.	Lab.	Pr.	Cr.
10-62	Embryology	3	3	6	4
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		15	3	30	16

FIFTH YEAR

TERM 13*		Cl.	Lab.	Pr.	Cr.
	Elective	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

TERM 14		Cl.	Lab.	Pr.	Cr.
10-65	Genetics	3	2	6	4
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		15	2	30	16

TERM 15		Cl.	Lab.	Pr.	Cr.
10-71	Hist. of Biol.	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

NOTE: Premedical students may be excused from the Co-operative Plan and may complete this program in four years, or after three years may take advantage of the Combined Program described on page 67.

*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Two-Year Premedical Technology Curriculum

FIRST YEAR†

TERM 1					TERM 2					TERM 3				
No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.

TERM 1				TERM 2				TERM 3			
30-01 English	3 0 6 3	30-02 English	3 0 6 3	30-03 English	3 0 6 3
11-01 Gen. Chem.	3 3 6 4	11-02 Gen. Chem.	3 3 6 4	11-03 Gen. Chem.	3 3 6 4
14-21 Basic Math.	3 0 6 3	14-22 Basic Math.	3 0 6 3	14-23 Basic Math.	3 0 6 3
10-01 Gen. Biol.	2 3 4 3	10-02 Gen. Biol.	2 3 4 3	10-03 Gen. Biol.	2 3 4 3
Mod. Lang. Elective	3 0 6 3	Mod. Lang. Elective	3 0 6 3	Mod. Lang. Elective	3 0 6 3
16-10 Phys. Tr.	0 2 0 0	16-11 Phys. Tr.	0 2 0 0	16-12 Phys. Tr.	0 2 0 0
	14 8 28 16		14 8 28 16		14 8 28 16

SECOND YEAR

TERM 4*				TERM 5				TERM 6			
10-04 Gen. Biol.	3 3 6 2	10-55 Comp. Anat.	3 3 6 4	10-56 Comp. Anat.	3 3 6 4
11-04 Gen. Chem.	3 3 6 2	11-17 Quant. Anal.	3 3 6 4	11-18 Quant. Anal.	2 3 4 3
15-11 Gen. Phys.	6 0 12 3	15-12 Gen. Phys.	3 3 9 5	15-13 Gen. Phys.	3 3 9 5
Mod. Lang. Elective	3 0 6 1½	Mod. Lang. Elective	4 0 8 4	Mod. Lang. Elective	4 0 8 4
	15 6 30 8½		13 9 29 17		12 9 27 16

TERM 5-A			
10-40 Physiology	3 3 6 4
11-26 Org. Chem.	3 3 6 4
Elective	4 0 8 4
Elective	4 0 8 4
	14 6 28 16

NOTE: Premedical Technology students who wish to continue for a degree may be excused from the Co-operative Plan and may complete requirements for a degree in four years.

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*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Curriculum in Psychology

FIRST YEAR†

Term 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
23-01	West. Civ.	4	0	8	4
14-21	Basic Math.	3	0	6	3
10-01	Gen. Biol.	2	3	4	3
	Mod. Lang. Elective	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		15	5	30	16

Term 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
23-02	West. Civ.	4	0	8	4
14-22	Basic Math.	3	0	6	3
10-02	Gen. Biol.	2	3	4	3
	Mod. Lang. Elective	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		15	5	30	16

Term 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
23-03	West. Civ.	4	0	8	4
14-23	Basic Math.	3	0	6	3
10-03	Gen. Biol.	2	3	4	3
	Mod. Lang. Elective	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		15	5	30	16

SECOND YEAR

Term 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
10-04	Gen. Biol.	3	3	6	2
23-04	West. Civ.	4	0	8	2
	Mod. Lang. Elective	3	0	6	1½
30-04	English	5	0	10	2½
		15	3	30	8

Term 5

No.	Course	Cl.	Lab.	Pr.	Cr.
20-05	Econ. Geog.	4	0	8	4
25-01	Int. Psych.	4	0	8	4
26-01	Prin. Soc.	4	0	8	4
	Mod. Lang. Elective	4	0	8	4
		16	0	32	16

Term 6

No.	Course	Cl.	Lab.	Pr.	Cr.
20-13	Econ. Prin.	4	0	8	4
25-02	Gen. Psych.	4	0	8	4
26-02	Prin. Soc.	4	0	8	4
	Mod. Lang. Elective	4	0	8	4
		16	0	32	16

THIRD YEAR

Term 7*

Course	Cl.	Lab.	Pr.	Cr.
Elective	8	0	16	4
Elective	8	0	16	4
	16	0	32	8

Term 8

No.	Course	Cl.	Lab.	Pr.	Cr.
25-09	Statistics	4	0	8	4
25-12	Exp. Psych.	3	3	6	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		15	3	30	16

Term 9

No.	Course	Cl.	Lab.	Pr.	Cr.
25-17	Measure. I	4	0	8	4
25-13	Exp. Psych.	3	3	6	4
	Elective	4	0	8	4
	Elective	4	0	8	4
		15	3	30	16

FOURTH YEAR

Term 10*

Course	Cl.	Lab.	Pr.	Cr.
Elective	8	0	16	4
Elective	8	0	16	4
	16	0	32	8

Term 11

No.	Course	Cl.	Lab.	Pr.	Cr.
25-20	Measure.III	4	0	8	4
25-34	Child Psych.	4	0	8	4
25-71	Seminar	2	0	1	1
	Elective	4	0	8	4
	Elective	4	0	8	4
		18	0	33	17

Term 12

No.	Course	Cl.	Lab.	Pr.	Cr.
25-14	Exp. Psych.	3	3	6	4
25-37	Child Psych.	4	0	8	4
25-72	Seminar	2	0	1	1
	Elective	4	0	8	4
	Elective	4	0	8	4
		17	3	31	17

FIFTH YEAR

Term 13*

Course	Cl.	Lab.	Pr.	Cr.
Elective	8	0	16	4
Elective	8	0	16	4
	16	0	32	8

Term 14

No.	Course	Cl.	Lab.	Pr.	Cr.
25-31	Ab. Psych.	4	0	8	4
25-41	Adv. Psych.	4	0	8	4
25-73	Seminar	2	0	1	1
	Elective	4	0	8	4
	Elective	4	0	8	4
		18	0	33	17

Term 15

No.	Course	Cl.	Lab.	Pr.	Cr.
25-32	Ab. Psych.	4	0	8	4
25-42	Adv. Psych.	4	0	8	4
25-74	Seminar	2	0	1	1
	Elective	4	0	8	4
	Elective	4	0	8	4
		18	0	33	17

*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Curriculum in Sociology

FIRST YEAR†

No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
TERM 1						**TERM 2**						**TERM 3**					
30-01	English	3	0	6	3	30-02	English	3	0	6	3	30-03	English	3	0	6	3
23-01	West. Civ.	4	0	8	4	23-02	West. Civ.	4	0	8	4	23-03	West. Civ.	4	0	8	4
22-01	Am. Gov.	3	0	6	3	22-02	Am. Gov.	3	0	6	3	22-03	Am. Gov.	3	0	6	3
15-07	Surv. Sci.	3	0	6	3	15-08	Surv. Sci.	3	0	6	3	15-09	Surv. Sci.	3	0	6	3
	Mod. Lang.						Mod. Lang.						Mod. Lang.				
	Elective	3	0	6	3		Elective	3	0	6	3		Elective	3	0	6	3
16-10	Phys. Tr.	0	2	0	0	16-11	Phys. Tr.	0	2	0	0	16-12	Phys. Tr.	0	2	0	0
		16	2	32	16			16	2	32	16			16	2	32	16

SECOND YEAR

No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
TERM 4*						**TERM 5**						**TERM 6**					
15-10	Surv. Sci.	4	0	8	2	20-05	Econ. Geog.	4	0	8	4	20-13	Econ. Prin.	4	0	8	4
23-04	West. Civ.	4	0	8	2	25-01	Int. Psych.	4	0	8	4	25-02	Gen. Psych.	4	0	8	4
	Mod. Lang.					26-01	Prin. Soc.	4	0	8	4	26-02	Prin. Soc.	4	0	8	4
	Elective	3	0	6	1½		Mod. Lang.						Mod. Lang.				
30-04	English	5	0	10	2½		Elective	4	0	8	4		Elective	4	0	8	4
		16	0	32	8			16	0	32	16			16	0	32	16

THIRD YEAR

No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
TERM 7*						**TERM 8**						**TERM 9**					
	Elective	8	0	16	4	20-14	Econ. Prob.	4	0	8	4	20-15	Econ. Prob.	4	0	8	4
	Elective	8	0	16	4	26-09	Am. Culture	4	0	8	4	26-10	Am. Gr. Rel.	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
		16	0	32	8			16	0	32	16			16	0	32	16

FOURTH YEAR

No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
TERM 10*						**TERM 11**						**TERM 12**					
	Elective	8	0	16	4	26-11	Soc. Prob.	4	0	8	4	26-12	Ind. & Soc.	4	0	8	4
	Elective	8	0	16	4	26-16	Criminology	4	0	8	4	26-17	Urban Soc.	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
		16	0	32	8			16	0	32	16			16	0	32	16

FIFTH YEAR

No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.	No.	Course	Cl.	Lab.	Pr.	Cr.
TERM 13*						**TERM 14**						**TERM 15**					
	Elective	8	0	16	4	26-18	Race & Cult.	4	0	8	4	26-20	Soc. Theory	4	0	8	4
	Elective	8	0	16	4	26-19	Soc. Theory	4	0	8	4	26-22	Prin.Soc.Wk.	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
							Elective	4	0	8	4		Elective	4	0	8	4
		16	0	32	8			16	0	32	16			16	0	32	16

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*Summer term — 5 weeks.
†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

NORTHEASTERN UNIVERSITY

COLLEGE OF

BUSINESS
ADMINISTRATION

Admission Requirements and Courses of Study

1954–1955

(*COEDUCATIONAL*)

BOSTON 15, MASSACHUSETTS
January, 1954

THE COLLEGE OF
BUSINESS ADMINISTRATION

Policy

THE COLLEGE OF BUSINESS ADMINISTRATION offers programs of professional education at the university level to meet the needs of the young men and women who hope to fill administrative positions in business. Intelligent management of our complex enterprises cannot be soundly undertaken without a full appreciation of the social, economic, and political environment in which business must operate, without a complete understanding of the basic principles of business, and without practical knowledge of the tools of business management.

The academic content of the different curricula in the College of Business Administration is, therefore, divided roughly as follows: one-eighth in English (writing and speaking), one-third in the social sciences, one-quarter in a special branch of business, and one-quarter in related business subjects. Since periods of probation and apprenticeship are inherent in the nature of positions at the administrative level, the Northeastern programs based upon the Co-operative Plan are especially significant.

Aims of the College

In keeping with current trends in collegiate business education, the educational policy of the college is directed toward the achievement of the following purposes:

First: To offer that type of education for business which will enable men and women to select most advisedly the field of business best suited to their aptitudes. The Co-operative Plan is particularly effective in this respect.

Second: To build for breadth of perspective through balanced, carefully coordinated programs of study in order to provide a background for specialization and yet not overlook basic professional requirements.

Third: To provide a thorough knowledge of fundamental economic laws and an understanding of their applications in business.

Fourth: To develop the habits of accurate thinking that are essential to sound judgment.

Fifth: To develop attitudes and ideals that are ethically sound and socially desirable.

Methods

In order that these aims may be realized as fully as possible, the College makes use of the problem and the case methods of instruction in addition to the lecture and recitation system. Students should learn to analyze every proposition, to challenge unsupported assertions, to think independently, and to support their thinking with logic and facts.

Hence, concrete problems and cases which executives have faced in accounting, marketing, organizing, and the like constitute a large proportion of classwork in the upper years.

Admission Requirements

Applicants for admission to the freshman class must qualify by graduation from an approved course of study in an accredited secondary school, including prescribed subjects listed on page 31.

Requirements for Graduation

Students may qualify for the degree of Bachelor of Science in Business Administration in one of the following options: Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management.

Candidates for the Bachelor of Science degree must complete all of the prescribed work of the curriculum in which they seek to qualify with a degree of proficiency acceptable to the faculty. Students who undertake co-operative work assignments must also meet the requirements of the Department of Co-operative Work before they become eligible for their degrees.

Students transferring from another college or university are not eligible to receive the B.S. degree until they have completed at least one academic year at Northeastern immediately preceding their graduation.

Scholarship Requirements

Students who fail to show satisfactory standards of general efficiency in their professional fields may be required to demonstrate their qualifications for the degree by taking such additional work as the faculty may prescribe. Those who are clearly unable to meet the accepted standard of attainment will be required to withdraw from the University. The degree conferred not only represents the formal completion of the subjects in the selected course of study but also indicates professional competence in the designated field of business administration.

R.O.T.C. Students

All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credit hours.

Graduation with Honor

Candidates who have achieved distinctly superior attainment in their academic work will be graduated with honor. Upon special vote of the faculty a limited number of this group may be graduated with high honor or with highest honor. Students must have been in attendance at the University at least three years before they may become eligible for honors at graduation.

Thesis Option

Theses are not required of candidates for the degree of Bachelor of Science in Business Administration Students who show special aptitude for thesis work, however, may be permitted to substitute an appropriate thesis for equivalent work in class. Such permission must be obtained by the candidate from the Dean of the College.

The Programs of Study

First Year

A full year of thirty weeks is devoted to a survey of the economic, political, and social institutions that underlie the conduct of business.

The basic tool of business, the keeping of accounts, is introduced during the first year to provide a practical check upon the interest and capacity of each student in the College of Business Administration.

English is given an important place and other courses fill the personal needs of the student and prepare him for the more advanced work. Throughout the year each student has the friendly counsel and guidance of a faculty adviser whose aim is to help bridge the gap between high school and college.

Upperclass Years

Under the Northeastern five-year Co-operative Plan, training on the job starts with the second year.

At the end of the second year, at the close of term 6, students formally elect their curricular options in accordance with their major fields of interest and natural aptitudes.

In each of Terms 7, 10 and 13, students will elect certain nonprofessional courses. A student may, for instance, elect to take a series of courses in education or to take advanced courses in English, history, government, sociology, psychology, or to take particular courses in other fields of study. The list of elective subjects for each term will be somewhat limited by schedule conflicts with the prescribed program of study but as wide a selection as practicable will be offered.

During the last year all students attend a series of meetings designed to prepare them for entrance into the business world. Under expert guidance each student prepares a complete personnel record, studies himself and the opportunities that are open to him, and generally establishes himself for his "commencement."

The Professional Options

All students are required to take common courses which are deemed necessary for a well-rounded training. These are pursued jointly with the professional work which has been selected, with a view to meeting the changing and expanding needs of present-day business conduct, while at the same time meeting the vocational needs of the students by way of earning a living. A brief statement of the vocational opportunities in the fields of work represented by each of the professional options follows:

I. Accounting — Many successful careers are open to the professional accountants. Their services are demanded by business, commerce, industry, and government. Better known among the wide variety of titles descriptive of their work are public and private accountant, controller, cost accountant, resident and traveling auditor, credit manager, statistician, investigator, adjuster, and financial accountant.

II. Industrial Relations — The day is past when "anyone" can direct labor-management relations. A host of opportunities exist, therefore, in this field, the human side of conducting a business. Both unions and management offer a wide selection of positions in personnel, bargaining, wage administration, and public

relations. The government, too, has many openings for men and women who have taken this program of studies.

III. Marketing and Advertising — Business and industry must sell its services and products to each other and to the general public. Successful marketing and selling means more than being a salesman. It demands knowledge of distribution channels, marketing practices and policies. It means also knowing how to buy in order to sell and then how to organize, promote and carry out the necessary sales and advertising campaigns.

Representative of the vast array of occupations and careers in marketing and advertising are Advertising Production Manager, Advertising Agency Account Executive, Public Relations Director, Advertising Space Salesman, Advertising Research, Advertising Manager, Merchandise Manager, Manufacturer's Agent, Publicity Director, Sales Promotion, Sales Executive, Market Analyst, Sales Research, Sales Manager, Store Manager, Department Store Buyer, Agency Owner, Copy Writer, Advertising Layout Man, Salesman, Teaching.

IV. Finance and Insurance — Financial institutions serving present-day business and industry are its life stream. Any list of these organizations which are indispensable in the conduct of business must include banks, insurance companies, investment houses, credit concerns, financial exchanges, business forecasting organizations, financial service institutions, mortgage companies, national and local real estate brokerage firms, and appraisers.

The option in Finance and Insurance opens the door to a host of careers in these institutions as well as the many governmental agencies regulating their operations.

V. Business Management — This curriculum might be called the basic program of the College of Business Administration. Graduates in Business Management find posts in small business, big business, and public service.

Here is the field of training for the person whose ambition is to start a business of his own.

Here is the field of training for the person who is thinking in terms of production control, planning, methods analysis, purchasing, traffic control, or other supervisory and executive work.

Here is the field of training for the person who is keenly aware of the possibilities in public administration. Increased use of city-management plans and increased number and prestige of civil service careers present a wide group of opportunities to graduates of this program.

Commercial Education and Secretarial Studies

It is possible for qualified students in any of the above curricula to elect in Terms 7, 10, and 13 certain courses in education offered by the College of Liberal Arts and to substitute courses in education in the senior year in order to qualify for a secondary school teaching certificate in business subjects and social studies.

Women students will be given the opportunity to take a sequence of courses in secretarial studies in order to qualify for executive secretarial positions or to teach in this field.

Curriculum in Accounting

FIRST YEAR†

Term 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
20-01	Econ. Geog.	3	0	6	3
22-01	Am. Govt.	3	0	6	3
41-01	Prin. of Acct.	4	0	8	4
27-11	Hist. Civil.	4	0	8	4
16-10	Phys. Tr.	0	2	0	0
		17	2	34	17

Term 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
20-02	Econ. Geog.	3	0	6	3
22-02	Am. Govt.	3	0	6	3
41-02	Prin. of Acct.	4	0	8	4
27-12	Hist. Civil.	4	0	8	4
16-11	Phys. Tr.	0	2	0	0
		17	2	34	17

Term 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	
20-03	Econ. Geog.	3	0	6	
22-03	Am. Govt.	3	0	6	
41-03	Prin. of Acct.	4	0	8	
27-13	Hist. Civil.	4	0	8	
16-12	Phys. Tr.	0	2	0	
		17	2	34	17

SECOND YEAR

Term 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-04	English Lit.	5	0	10	2½
20-09	Int. to Stat. Graphic Pres.	3	6	9	3
27-14	Hist. Civil.	4	0	8	2
		12	6	27	7½

Term 5

No.	Course	Cl.	Lab.	Pr.	Cr.
43-21	Prin.ofMktg.	3	0	6	3
44-20	Int. to Fin.	3	0	6	3
45-21	Prin. of Bus. Mgt.	3	0	6	3
41-25	Prin. of Acct.	4	0	8	4
25-01	Int.toPsych.	4	0	8	4
		17	0	34	17

Term 6

No.	Course	Cl.	Lab.	Pr.	Cr.
43-22	Prin. of Adv.	3	0	6	
44-22	Prin. of Ins.	3	0	6	
45-22	Prin. of Bus. Mgt.	3	0	6	
41-26	Inter. Acct.	4	0	8	
25-02	Gen. Psych.	4	0	8	
		17	0	34	17

THIRD YEAR

Term 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
20-13	Econ. Prin.	8	0	16	4
	Elective	8	0	16	4
		16	0	32	8

Term 8

No.	Course	Cl.	Lab.	Pr.	Cr.
20-14	Econ. Probs.	4	0	8	4
30-05	Public Spkg.	4	0	8	4
44-31	Bus. Finance	4	0	8	4
41-37	Int. Acct.	2	2	5	3
41-31	Cost Acct.	3	0	6	3
		17	2	35	18

Term 9

No.	Course	Cl.	Lab.	Pr.	Cr.
20-15	Econ. Probs.	4	0	8	
30-06	Public Spkg.	4	0	8	
44-32	Bus. Finance	4	0	8	
41-38	Int. Acct.	2	2	5	
41-32	Cost Acct.	3	0	6	
		17	2	35	18

FOURTH YEAR

Term 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-10s	Probs.inWr.	5	0	10	2½
	Elective	5	0	10	2½
	Elective	5	0	10	2½
		15	0	30	7½

Term 11

No.	Course	Cl.	Lab.	Pr.	Cr.
20-20	Statistics	3	2	7	4
46-41	Leg. Asp. of Bus. I	4	0	8	4
41-48	Cost Acct.	3	0	6	3
41-45	Adv. Acct. Pr. A	2	2	5	3
41-43	Auditing	2	2	5	3
		14	6	31	17

Term 12

No.	Course	Cl.	Lab.	Pr.	Cr.
20-21	Statistics	3	2	7	
46-42	Leg. Asp. of Bus. II	4	0	8	
41-49	Cost Acct.	3	0	6	
20-26a	LaborEcon.	3	0	6	
	or				
20-24a	Mon.&Bkg.	3	0	6	
41-44	Auditing	2	2	5	
		15	4	32	17

FIFTH YEAR

Term 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-08s	Bus. Comm.	5	0	10	2½
	Elective	5	0	10	2½
	Elective	5	0	10	2½
		15	0	30	7½

Term 14

No.	Course	Cl.	Lab.	Pr.	Cr.
20-40	Bus.&Govt.	4	0	8	4
46-57	Law of Corp. Fin.&Ins.	4	0	8	4
46-53	Inc.TaxLaws	3	0	6	3
41-50	Fiduciary Acct.	2	2	5	3
41-46	Adv. Acct. Pr. B	2	2	5	3
		15	4	32	17

Term 15

No.	Course	Cl.	Lab.	Pr.	Cr.
20-28	Comp.Ec.Sy.	4	0	8	
46-54	Inc.TaxLaws	3	0	6	
41-51	SystemBldg.	2	2	5	
41-47	Adv. Acct. Pr. C	2	2	5	
	Elective	4	0	8	
		15	4	32	17

*Summer term — 5 weeks.

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Curriculum in Industrial Relations

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
20-01	Econ. Geog.	3	0	6	3
22-01	Am. Govt.	3	0	6	3
41-01	Prin. of Acct.	4	0	8	4
27-11	Hist. Civil.	4	0	8	4
16-10	Phys. Tr.	0	2	0	0
		17	2	34	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
20-02	Econ. Geog.	3	0	6	3
22-02	Am. Govt.	3	0	6	3
41-02	Prin. of Acct.	4	0	8	4
27-12	Hist. Civil.	4	0	8	4
16-11	Phys. Tr.	0	2	0	0
		17	2	34	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
20-03	Econ. Geog.	3	0	6	3
22-03	Am. Govt.	3	0	6	3
41-03	Prin. of Acct.	4	0	8	4
27-13	Hist. Civil.	4	0	8	4
16-12	Phys. Tr.	0	2	0	0
		17	2	34	17

SECOND YEAR

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-04	English Lit.	5	0	10	2½
21-09	Int. to Stat. Graphic Pres.	3	6	9	3
27-14	Hist. Civil.	4	0	8	2
		12	6	27	7½

TERM 5

No.	Course	Cl.	Lab.	Pr.	Cr.
43-21	Prin.of Mktg.	3	0	6	3
44-20	Int. to Fin.	3	0	6	3
45-21	Prin. of Bus. Mgt.	3	0	6	3
41-25	Prin. of Acct.	4	0	8	4
25-01	Int.to Psych.	4	0	8	4
		17	0	34	17

TERM 6

No.	Course	Cl.	Lab.	Pr.	Cr.
43-22	Prin.of Adv.	3	0	6	3
44-22	Prin. of Ins.	3	0	6	3
45-22	Prin. of Bus. Mgt.	3	0	6	3
41-27	Acctg. State.	4	0	8	4
25-02	Gen. Psych.	4	0	8	4
		17	0	34	17

THIRD YEAR

TERM 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
20-13	Econ. Prin.	8	0	16	4
21-07s	Sociology	8	0	16	4
		16	0	32	8

TERM 8

No.	Course	Cl.	Lab.	Pr.	Cr.
20-14	Econ. Prob.	4	0	8	4
44-31	Bus. Finance	4	0	8	4
30-05	Public Spkg.	4	0	8	4
45-33	Mgt. Probs. Pers.	3	0	6	3
25-35	Ind. Psych.	3	0	6	3
		18	0	36	18

TERM 9

No.	Course	Cl.	Lab.	Pr.	Cr.
20-15	Econ. Prob.	4	0	8	4
44-32	Bus. Finance	4	0	8	4
30-06	Public Spkg.	4	0	8	4
45-34	Mgt. Probs. Prod.	3	0	6	3
25-36	Ind. Psych.	3	0	6	3
		18	0	36	18

FOURTH YEAR

TERM 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
21-33	Cost for Mgt.	10	0	20	5
	Elective	5	0	10	2½
		15	0	30	7½

TERM 11

No.	Course	Cl.	Lab.	Pr.	Cr.
20-20	Statistics	3	2	7	4
20-18	Am.Ec.Hist.	4	0	8	4
46-41	Leg. Asp. of Bus. I	4	0	8	4
20-26a	LaborEcon.	3	0	6	3
30-10	Probs. in Wr.	3	0	6	3
		17	2	35	18

TERM 12

No.	Course	Cl.	Lab.	Pr.	Cr.
20-21	Statistics	3	2	7	4
42-44	Wage Adm.	3	0	6	3
46-42	Leg. Asp. of Bus. II	4	0	8	4
42-17	Prob.inPers.	3	0	6	3
30-08	Bus. Comm.	3	0	6	3
		16	2	33	17

FIFTH YEAR

TERM 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
21-42	Bud. Proc.	5	0	10	2½
	Elective	5	0	10	2½
	Elective	5	0	10	2½
		15	0	30	7½

TERM 14

No.	Course	Cl.	Lab.	Pr.	Cr.
20-40	Bus.&Govt.	4	0	8	4
46-55	Labor Law	3	0	6	3
42-52	Mot.&Time	2	2	5	3
20-25a	Bus. Cycles	3	0	6	3
45-50	Prod. Con.	4	0	8	4
		16	2	33	17

TERM 15

No.	Course	Cl.	Lab.	Pr.	Cr.
20-28	CompEc.Sys.	4	0	8	4
46-56	Law of Merch.	4	0	8	4
	or				
	Elective	4	0	8	4
42-62	Sem.Col.Bg.	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

† Summer term — 5 weeks.

* All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Curriculum in Marketing and Advertising

FIRST YEAR†

TERM 1						TERM 2						TERM 3				
No. Course	Cl.	Lab.	Pr.	Cr.		No. Course	Cl.	Lab.	Pr.	Cr.		No. Course	Cl.	Lab.	Pr.	C
30-01 English	3	0	6	3		30-02 English	3	0	6	3		30-03 English	3	0	6	
20-01 Econ. Geog.	3	0	6	3		20-02 Econ. Geog.	3	0	6	3		20-03 Econ. Geog.	3	0	6	
22-01 Am. Govt.	3	0	6	3		22-02 Am. Govt.	3	0	6	3		22-03 Am. Govt.	3	0	6	
41-01 Prin. of Acct.	4	0	8	4		41-02 Prin. of Acct.	4	0	8	4		41-03 Prin. of Acct.	4	0	8	
27-11 Hist. Civil.	4	0	8	4		27-12 Hist. Civil.	4	0	8	4		27-13 Hist. Civil.	4	0	8	
16-10 Phys. Tr.	0	2	0	0		16-11 Phys. Tr.	0	2	0	0		16-12 Phys. Tr.	0	2	0	
	17	2	34	17			17	2	34	17			17	2	34	

SECOND YEAR

TERM 4*						TERM 5						TERM 6				
30-04 English Lit.	5	0	10	2½		43-21 Prin.of Mktg.	3	0	6	3		43-22 Prin. of Adv.	3	0	6	
20-09 Int. to Stat. Graphic Pres.	3	6	9	3		44-20 Int. to Fin.	3	0	6	3		44-22 Prin. of Ins.	3	0	6	
27-14 Hist. Civil.	4	0	8	2		45-21 Prin. of Bus. Mgt.	3	0	6	3		45-22 Prin. of Bus. Mgt.	3	0	6	
						41-25 Prin. of Acct.	4	0	8	4		41-27 Acct. State.	4	0	8	
						25-01 Int.to Psych.	4	0	8	4		25-02 Gen. Psych.	4	0	8	
	12	6	27	7½			17	0	34	17			17	0	34	

THIRD YEAR

TERM 7*						TERM 8						TERM 9				
20-13 Econ. Prin.	8	0	16	4		20-14 Econ. Probs.	4	0	8	4		20-15 Econ. Probs.	4	0	8	
26-07s Sociology	8	0	16	4		30-05 Public Spkg.	4	0	8	4		30-06 Public Spkg.	4	0	8	
						43-30 Salesmans'p	3	0	6	3		43-31 Copy Wtg.	3	0	6	
						43-32 Sales Mgt.	3	0	6	3		43-33 Sales Mgt.	3	0	6	
						44-31 Bus. Finance	4	0	8	4		44-32 Bus. Finance	4	0	8	
	16	0	32	8			18	0	36	18			18	0	36	

FOURTH YEAR

TERM 10*						TERM 11						TERM 12				
30-10s Prob. in Wr.	5	0	10	2½		20-20 Statistics	3	2	7	4		20-21 Statistics	3	2	7	
Elective	5	0	10	2½		20-18 Am.Ec.Hist.	4	0	8	4		43-40 Advtg. Prod.	4	0	5	
Elective	5	0	10	2½		46-41 Leg. Asp. of Bus. I	4	0	8	4		46-42 Leg. Asp. of Bus. II	4	0	8	
						43-44 For. Mktg.	2	0	4	2		30-17 Lit.(Shakespeare)	3	0	6	
						43-43 Mktg. Res.	4	0	8	4		43-46 Cr. & Coll.	3	0	6	
	15	0	30	7½			17	2	35	18			17	2	32	

FIFTH YEAR

TERM 13*						TERM 14						TERM 15				
30-08s Bus. Comm.	5	0	10	2½		20-40 Bus.&Govt.	4	0	8	4		20-28 Comp.Ec.Sy.	4	0	8	
Elective	5	0	10	2½		43-61 Seminar in Mktg. & Advtg.	3	0	6	3		46-56 Law of Merch.	4	0	8	
Elective	5	0	10	2½		43-53 Prob.in Adv.	3	0	6	3		43-52 Ret. Merch.	4	0	8	
						24-13a Ethics	3	0	6	3		43-54 Prob.in Adv. or	4	0	8	
						Elective	4	0	8	4		43-62 Thesis in Mktg. & Advtg.	4	0	8	
	15	0	30	7½			17	0	34	17			16	0	32	

*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Curriculum in Finance and Insurance

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
30-01	English	3	0	6	3
20-01	Econ. Geog.	3	0	6	3
22-01	Am. Govt.	3	0	6	3
41-01	Prin. of Acct.	4	0	8	4
27-11	Hist. Civil.	4	0	8	4
16-10	Phys. Tr.	0	2	0	0
		17	2	34	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
30-02	English	3	0	6	3
20-02	Econ. Geog.	3	0	6	3
22-02	Am. Govt.	3	0	6	3
41-02	Prin. of Acct.	4	0	8	4
27-12	Hist. Civil.	4	0	8	4
16-11	Phys. Tr.	0	2	0	0
		17	2	34	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
30-03	English	3	0	6	3
20-03	Econ. Geog.	3	0	6	3
22-03	Am. Govt.	3	0	6	3
41-03	Prin. of Acct.	4	0	8	4
27-13	Hist. Civil.	4	0	8	4
16-12	Phys. Tr.	0	2	0	0
		17	2	34	17

SECOND YEAR

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-04	English Lit.	5	0	10	2½
20-09	Int. to Stat. Graphic Pres.	3	6	9	3
27-14	Hist. Civil.	4	0	8	2
		12	6	27	7½

TERM 5

No.	Course	Cl.	Lab.	Pr.	Cr.
43-21	Prin.of Mktg.	3	0	6	3
44-20	Int. to Fin.	3	0	6	3
45-21	Prin. of Bus. Mgt.	3	0	6	3
41-25	Prin. of Acct.	4	0	8	4
25-01	Int.to Psych.	4	0	8	4
		17	0	34	17

TERM 6

No.	Course	Cl.	Lab.	Pr.	Cr.
43-22	Prin. of Adv.	3	0	6	3
44-22	Prin. of Ins.	3	0	6	3
45-22	Prin. of Bus. Mgt.	3	0	6	3
41-27	Acctg. State.	4	0	8	4
25-02	Gen. Psych.	4	0	8	4
		17	0	34	17

THIRD YEAR

TERM 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
20-13	Prin.of Econ.	8	0	16	4
26-07s	Sociology	8	0	16	4
		16	0	32	8

TERM 8

No.	Course	Cl.	Lab.	Pr.	Cr.
20-14	Econ. Probs.	4	0	8	4
44-31	Bus. Finance	4	0	8	4
44-33	Life Ins.	3	0	6	3
30-05	Public Spkg.	4	0	8	4
44-43	Math. of Fin.	3	0	6	3
		18	0	36	18

TERM 9

No.	Course	Cl.	Lab.	Pr.	Cr.
20-15	Econ. Probs.	4	0	8	4
44-32	Bus. Finance	4	0	8	4
44-34	Prop. Ins.	3	0	6	3
30-06	Public Spkg.	4	0	8	4
44-44	Math. of Fin.	3	0	6	3
		18	0	36	18

FOURTH YEAR

TERM 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-10	Probs. in Wr.	5	0	10	2½
	Elective	5	0	10	2½
	Elective	5	0	10	2½
		15	0	30	7½

TERM 11

No.	Course	Cl.	Lab.	Pr.	Cr.
20-20	Statistics	3	2	7	4
20-18	Am.Ec.Hist.	4	0	8	4
46-41	Leg. Asp. of Bus. I	4	0	8	4
44-41	Invest. I	3	0	6	3
20-51a	Pub. Fin.	3	0	6	3
		17	2	35	18

TERM 12

No.	Course	Cl.	Lab.	Pr.	Cr.
20-21	Statistics	3	2	7	4
20-24a	Mon.&Bkg.	3	0	6	3
46-42	Leg. Asp. of Bus. II	4	0	8	4
44-42	Invest. II	3	0	6	3
43-46	Cred.&Coll.	3	0	6	3
		16	2	33	17

FIFTH YEAR

TERM 13

No.	Course	Cl.	Lab.	Pr.	Cr.
30-08	Bus. Comm.	5	0	10	2½
	Elective	5	0	10	2½
	Elective	5	0	10	2½
		15	0	30	7½

TERM 14

No.	Course	Cl.	Lab.	Pr.	Cr.
20-40	Bus.&Govt.	4	0	8	4
46-57	Law of Corp. Fin.&Ins.	4	0	8	4
20-25a	Bus. Cycles	3	0	6	3
44-51	Trust Mgt.	3	0	6	3
24-13a	Ethics	3	0	6	3
		17	0	34	17

TERM 15

No.	Course	Cl.	Lab.	Pr.	Cr.
20-28	Comp.Ec.Sy.	4	0	8	4
44-62	Seminar	4	0	8	4
44-52	Secur. Mkts.	4	0	8	4
	Elective	4	0	8	4
		16	0	32	16

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*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Curriculum in Business Management

FIRST YEAR†

TERM 1						TERM 2						TERM 3				
No. Course	Cl.	Lab.	Pr.	Cr.		No. Course	Cl.	Lab.	Pr.	Cr.		No. Course	Cl.	Lab.	Pr.	Cr.
30-01 English	3	0	6	3		30-02 English	3	0	6	3		30-03 English	3	0	6	3
20-01 Econ. Geog.	3	0	6	3		20-02 Econ. Geog.	3	0	6	3		20-03 Econ. Geog.	3	0	6	3
22-01 Am. Govt.	3	0	6	3		22-02 Am. Govt.	3	0	6	3		22-03 Am. Govt.	3	0	6	3
41-01 Prin. of Acct.	4	0	8	4		41-02 Prin. of Acct.	4	0	8	4		41-03 Prin. of Acct.	4	0	8	4
27-11 Hist. Civil.	4	0	8	4		27-12 Hist. Civil.	4	0	8	4		27-13 Hist. Civil.	4	0	8	4
16-10 Phys. Tr.	0	2	0	0		16-11 Phys. Tr.	0	2	0	0		16-12 Phys. Tr.	0	2	0	0
	17	2	34	17			17	2	34	17			17	2	34	17

SECOND YEAR

TERM 4*						TERM 5						TERM 6				
30-04 English Lit.	5	0	10	2½		43-21 Prin.of Mktg.	3	0	6	3		43-22 Prin. of Adv.	3	0	6	3
20-09 Int. to Stat.	3	6	9	3		44-20 Int. to Fin.	3	0	6	3		44-22 Prin. of Ins.	3	0	6	3
Graphic Pres.						45-21 Prin. of Bus.						45-22 Prin. of Bus.				
27-14 Hist. Civil.	4	0	8	2		Mgt.	3	0	6	3		Mgt.	3	0	6	3
						41-25 Prin. of Acct.	4	0	8	4		41-27 Acctg. State.	4	0	8	4
						25-01 Int.toPsych.	4	0	8	4		25-02 Gen. Psych.	4	0	8	4
	12	6	27	7½			17	0	34	17			17	0	34	17

THIRD YEAR

TERM 7*						TERM 8						TERM 9				
20-13 Econ. Prin.	8	0	16	4		20-14 Econ. Probs.	4	0	8	4		20-15 Econ. Probs.	4	0	8	4
Elective	8	0	16	4		44-31 Bus. Finance	4	0	8	4		44-32 Bus. Finance	4	0	8	4
						30-05 Public Spkg.	4	0	8	4		30-06 Public Spkg.	4	0	8	4
						25-35a Ind. Psych.	3	0	6	3		25-36a Ind. Psych.	3	0	6	3
						45-33 Mtg. Probs.						45-34 Mgt. Probs.				
						Pers.	3	0	6	3		Prod.	3	0	6	3
	16	0	32	8			18	0	36	18			18	0	36	18

FOURTH YEAR

TERM 10*						TERM 11						TERM 12				
41-33 Cost for Mgt.	10	0	20	5		20-20 Statistics	3	2	7	4		20-21 Statistics	3	2	7	4
Elective	5	0	10	2½		20-18 Am.Ec.Hist.	4	0	8	4		43-46 Cred.&Coll.	3	0	6	3
						46-41 Leg. Asp. of						46-42 Leg. Asp. of				
						Bus. I	4	0	8	4		Bus. II	4	0	8	4
						20-26a Labor Ec.	3	0	6	3		42-44 Wage Adm.	3	0	6	3
						30-10 Probs. in Wr.	3	0	6	3		or				
												45-45 Trans. Prac.	4	0	8	4
												30-08 Bus. Comm.	3	0	6	3
	15	0	30	7½			17	2	35	18			16	2	33	17
												or 17	2	35	18

FIFTH YEAR

TERM 13*						TERM 14						TERM 15				
41-42 BudgetProc.	5	0	10	2½		20-40 Bus.&Govt.	4	0	8	4		20-28 Comp.Ec.Sy.	4	0	8	4
Elective	5	0	10	2½		43-43 Mktg. Res.	4	0	8	4		46-56 LawofMerch.	4	0	8	4
Elective	5	0	10	2½		45-52 Mgt.of Sales	2	0	4	2		43-52 RetailMerch.	4	0	8	4
						42-52 Mot.&Time	2	2	5	3		or				
						or						45-46 Traffic Mgt.	4	0	8	4
						45-51 Office Mgt.	3	0	6	3		Elective	4	0	8	4
						45-50 Prod. Con.	4	0	8	4						
	15	0	30	7½			16	2	33	17			16	0	32	16
						or 17	0	34								

*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

NORTHEASTERN UNIVERSITY

COLLEGE OF

ENGINEERING

Admission Requirements and Courses of Study
Undergraduate Curricula

1954–1955

(*COEDUCATIONAL*)

*Evening graduate engineering programs are described in a separate catalog

BOSTON 15, MASSACHUSETTS
January, 1954

THE COLLEGE OF ENGINEERING

Aims and Methods

IT IS the purpose of the College of Engineering to provide educational pro-grams which will effectively prepare students to become professional prac-titioners, to enter graduate schools, or to accept employment in the many industrial fields in which an engineering background is helpful. Principally con-cerned with undergraduate instruction, the College is operated upon the Co-operative Plan and offers five-year curricula leading to the baccalaureate degree in civil, mechanical, electrical, chemical, and industrial engineering.

The academic program begins with a 30-week freshman year of full-time study during which the student continues to build the foundation in mathematics, the physical sciences, and means of expression that were begun in high school. Co-operative work in the same general field of engineering for which he is preparing begins with the second year and continues throughout the upperclass program. Thus the student has an opportunity to gain some insight into problems of actual engineering practice as he progresses through the course of study at the college.

In keeping with recent trends in engineering education, the co-operative curricula at Northeastern comprise a balanced sequence of courses in which the technological disciplines occupy about four-fifths of the student's program and the humanistic or general studies about one-fifth. These two aspects of the under-graduate curriculum are integrated throughout the entire five years so that growth in cultural understanding proceeds hand in hand with development of technical knowledge and skill. This plan, widely utilized in engineering educa-tion, is quite different from that in legal or medical education in which the general studies precede the professional training, but it has proved to be highly effective in the preparation of engineers and industrial leaders.

The courses of study in the first year are identical for all engineering students and it is possible for any of them to change his curriculum at the end of the freshman year without loss of time. Emphasis throughout all curricula is laid upon fundamental concepts and skills so that the student may develop an ade-quate foundation upon which to base his professional development. In the undergraduate programs relatively little time can be devoted to courses in specialized aspects of current engineering practice. These must in the main be given in graduate schools where specialization is appropriate and possible.

Undergraduate curricula at Northeastern are designed to develop young men and women with well-balanced personal qualities, a sense of civic responsibility, an understanding of industrial job requirements, and a technical competence sufficient to begin a professional career. Instruction both in the classroom and in the laboratory is designed to place maximum emphasis upon individual initiative and responsibility and to develop the student's powers of analysis.

Because an engineering education teaches the student to search out the truth, to think clearly, and to formulate conclusions based upon a solid foundation of facts, engineers are being called upon more and more to occupy positions of responsibility in the management of our great industrial enterprises. Even in such diverse fields as banking, public health, and public administration, this so-called engineering approach is in demand.

Although no graduate engineering curricula are offered during the day, the College does have an evening program of graduate studies for young engineers employed in the Greater Boston area. These graduate curricula in certain fields of civil, mechanical, and electrical engineering lead to the degree of Master of Science in Engineering. Curricula are also available leading to the degrees of Master of Science in Chemistry and in Mathematics-Physics.

Admission Requirements

Applicants for admission to the freshman class must qualify by graduation from an approved course of study in an accredited secondary school, including the prescribed subjects listed on page 31.

Graduation Requirements

The College of Engineering offers five-year curricula, conducted on the Co-operative Plan, leading to the following degrees:
1. Bachelor of Science in Civil Engineering
2. Bachelor of Science in Mechanical Engineering
3. Bachelor of Science in Electrical Engineering
4. Bachelor of Science in Chemical Engineering
5. Bachelor of Science in Industrial Engineering

These curricula are described in the following pages. Since the first year is the same for all engineering students, final choice of curriculum need not be made until the beginning of the second year.

Candidates for the Bachelor of Science degree must complete all of the prescribed work of the curriculum in which they seek to qualify. A total of 232 credit hours (equivalent to 145 semester hours) is required for the degree. Students who undertake co-operative work assignments must meet the requirements of the Department of Co-operative Work before they become eligible for their degrees.

No student transferring from another college or university is eligible to receive the S.B. degree until he has completed at least one academic year at Northeastern immediately preceding his graduation.

R.O.T.C. Students

All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credit hours.

Scholarship Requirements

Students who fail to show a satisfactory standard of general efficiency in their professional fields may be required to demonstrate their qualifications for the degree by taking such additional work as the faculty may prescribe. If they are clearly unable to meet the accepted standard of attainment, they will be required to withdraw from the University.

Since the degree must represent competence in the student's chosen pro-

fessional field, it cannot be awarded for mere low grade completion of the required courses.

Graduation with Honor

Candidates who have achieved distinctly superior attainment in their academic work will be graduated with honor. Upon special vote of the faculty a limited number of this group may be graduated with high honor or with highest honor. Students must have been in attendance at the University at least three years before they may become eligible for honors at graduation.

Engineering Curricula

Civil Engineering

The field of civil engineering has to do with the planning and building of all kinds of structures and public works. None of the structures of civil engineers lend themselves to quantity production in a factory. Not only are civil engineering works designed to fit a single location, but ordinarily their value is dependent upon their ability to resist forces tending to move them.

Civil engineering is as old as civilization itself and, until recent times, it embraced all phases of engineering except those of a military character. Today its major branches include topographical, municipal, railroad, highway, structural, hydraulic, and sanitary engineering. It covers land surveying, soil mechanics, the building of railroads, harbors, docks, and similar structures, the construction of sewers, water works, streets, and highways, the design and construction of flood control projects, bridges, buildings, walls, foundations, and of all fixed structures.

Because civil engineering covers such a broad field, it is not possible to become expert in all its branches. All of these, however, rest upon a relatively compact body of principles and, broadly speaking, it may be said that the civil engineer deals largely with accurate descriptions of locations (surveys) and with applications of the mechanics of resistance to motion (statics).

Since the first step in every civil engineering project involves accurate measurement of the surface features of the land, of the nature of the soil, and of the character of the underlying rock, the study of surveying and related subjects occupies a large place in the civil engineering curriculum. And since the primary consideration in designing any structure is to make certain that it will withstand safely any force to which it may be subjected, the mechanics of static bodies, strength of materials, and theory of structures are studied in detail. The curriculum is thus intended to prepare the young civil engineer to take up the work of design and construction of structures, to solve the problems of water supply and waste disposal in urban areas, and intelligently to undertake the supervision of work in allied fields of engineering and in general contracting.

Upon graduation, the young engineer may expect a period of apprenticeship either in the field, surveying and plotting, or in the office, over the drafting board. As experience is gained, the graduate is entrusted with greater responsibilities in actual design and supervision of construction. Those who prefer a roving existence should direct their ambitions toward private fields, while those who prefer a stable home and community life will seek opportunities in the public service of the Federal Government and the various states and municipalities.

Curriculum in Civil Engineering

FIRST YEAR†

Term 1					Term 2					Term 3				
No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.	No. Course	Cl.	Lab.	Pr.	Cr.
1-01 Chemistry	3	3	6	4	11-02 Chem.	3	3	6	4	11-03 Chem.	3	3	6	4
2-01 Drawing	0	6	3	3	12-02 Drawing	0	6	3	3	12-03 Drawing	0	6	3	3
4-01 Math.	5	0	7	4	14-02 Math.	5	0	7	4	14-03 Math.	5	0	10	5
5-01 Physics	3	0	6	3	15-02 Physics	3	0	6	3	15-03 Physics	3	0	6	3
0-01 English	3	0	6	3	30-02 English	3	0	6	3	30-03 English	3	0	6	3
6-10 Phys. Tr.	0	2	0	0	16-11 Phys. Tr.	0	2	0	0	16-12 Phys. Tr.	0	2	0	0
	14	11	28	17		14	11	28	17		14	11	31	18

SECOND YEAR

Term 4*					Term 5					Term 6				
1-04 Chemistry	3	3	6	2	20-11 Econ.	3	0	6	3	20-12 Econ.	3	0	6	3
5-04 Physics	3	0	6	1½	14-05 Diff. Calc.	4	0	8	4	14-06 Int. Calc.	4	0	8	4
4-04 Math.	5	0	10	2½	15-05 Physics	3	3	6	3	15-06 Physics	3	3	6	4
3-05 Am. Hist.	6	0	12	3	3-01 Elec. Eng.	3	0	6	3	3-02 Elec. Eng.	3	0	6	3
					1-10 Surveying	4	3	5	4	2-20 App. Mech.	4	0	8	4
	17	3	34	9		17	6	31	18		17	3	34	18

THIRD YEAR

Term 7*					Term 8					Term 9				
2-05 Am. Govt.	4	0	8	2	14-07 Diff. Eq.	4	0	5	3	22-08 Cur. Pol. Iss.				
2-30 Pwr. Pl. Eq.	5	0	10	2½	2-21 App. Mech.	3	0	6	3	or				
2-04 Mach. Draw.	0	9	3	2	2-31 Heat Eng.	3	0	6	3	23-08 Cont. Orient	3	0	6	3
2-50 Prod. Proc.	5	0	10	2½	1-11 Surveying	4	3	5	4	2-22 Str. of Matls.	4	0	8	4
					13-01 Gen. Geol.	3	0	6	3	1-20 Hydraulics	3	0	6	3
					2-40 Materials	2	0	4	2	1-12 Surveying	4	3	5	4
										1-58 Eng. Geol.	4	0	8	4
	14	9	31	9		19	3	32	18		18	3	33	18

FOURTH YEAR

Term 10*					Term 11					Term 12				
0-07 Effec. Spkg.	6	0	12	3	2-23 Str. of Matls.	3	0	6	3	1-54 Des. of Struc.	2	4	0	2
1-13 Surveying	0	18	0	3	1-40 Struct. Anal.	3	0	6	3	1-41 Struct. Anal.	4	0	8	4
0-17 Literature	6	0	12	3	1-49 Conc. T. Lab.	1	4	4	3	1-50 Concrete	3	0	6	3
					1-21 Hydraulics	3	0	6	3	2-64 Test. Mat. L.	1	4	4	3
					44-13 Cons. Fin.	3	0	6	3	2-24 Adv. Mech.	3	0	6	3
					24-07 Philosophy					24-08 Philosophy				
					or					or				
					25-07 Psychology	3	0	6	3	25-08 Psychology	3	0	6	3
	12	18	24	9		16	4	34	18		16	8	30	18

FIFTH YEAR

Term 13*					Term 14					Term 15				
6-03 Contracts &					1-42 Struct. Anal.	3	0	6	3	1-43 Struct. Anal.	4	0	8	4
Agency	6	0	12	3	1-51 Concrete	3	0	6	3	1-57 Found. Eng.	2	0	4	2
2-06 Municipal Gvt.					1-55 Des. of Struc.	3	6	0	3	1-56 Des. of Struc.	0	9	0	3·
or					1-24 San. Eng.	3	0	6	3	1-25 San. Eng.	3	3	6	4
3-06 Rec. Eur. His.	6	0	12	3	1-30 Transp.	4	0	5	3	1-31 Transp.	2	0	4	2
0-18 Literature	6	0	12	3	50-01 Prof. Devel.	3	0	6	3	1-60 Cons. Costs	3	0	6	3
	18	0	36	9		19	6	29	18		14	12	28	18

Summer term — 5 weeks.
All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Mechanical Engineering

The field of mechanical engineering is concerned with the harnessing of power resources by means of machinery to perform useful work. With the increasing mechanization of all industry which has taken place during the last century, the field has so broadened as to include all lines of industry.

In contrast to the civil engineer who deals primarily with static forces, the mechanical engineer is more concerned with the mechanics of motion or kinetics. And because moving parts require constant care and adjustment, the mechanical engineer has the task not only of designing and installing complicated machinery but also of operating it efficiently after it has been installed.

Among the major branches of mechanical engineering are included combustion or power production engineering, machine and machine-tool design, railway mechanical engineering, automotive engineering, aeronautical engineering, refrigerating engineering, and air conditioning engineering. The construction and operation of furnaces, boilers, and engines, the design of all kinds of machinery from pocket watches to steel mills, the construction and operation of railway and other transportation equipment including automobiles and airplanes, and even control of atmospheric conditions by means of heating and air conditioning equipment, all fall in this field.

Since machinery is so predominantly the concern of the mechanical engineer, the program of study is designed to give the student considerable training in the principles underlying the design and operation of engines, power transmission devices, machine tools, and other machinery. This, of course, implies a thorough study of the physical laws concerning motion and transfer of energy. Applied mechanics and thermodynamics occupy a prominent place in the curriculum. The program of instruction thus gives the student a broad foundation in those fundamental subjects essential to all engineering practice and, in the senior year, provides for limited specialization.

For those students desiring to specialize in the field of industrial management, attention is called to the curriculum in industrial engineering, the basic training of which is essentially the same as that in mechanical engineering.

The graduate mechanical engineer generally finds employment in an industrial plant, either in design and research or in plant operation and maintenance. And if his abilities lie in that direction, he frequently is entrusted after a time with greater and greater responsibility for the successful management of the enterprise.

Curriculum in Mechanical Engineering

FIRST YEAR†

Term 1

No.	Course	Cl.	Lab.	Pr.	Cr.
11-01	Chemistry	3	3	6	4
12-01	Drawing	0	6	3	3
14-01	Math.	5	0	7	4
15-01	Physics	3	0	6	3
30-01	English	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		14	11	28	17

Term 2

No.	Course	Cl.	Lab.	Pr.	Cr.
11-02	Chemistry	3	3	6	4
12-02	Drawing	0	6	3	3
14-02	Math.	5	0	7	4
15-02	Physics	3	0	6	3
30-02	English	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		14	11	28	17

Term 3

No.	Course	Cl.	Lab.	Pr.	Cr.
11-03	Chemistry	3	3	6	4
12-03	Drawing	0	6	3	3
14-03	Math.	5	0	10	5
15-03	Physics	3	0	6	3
30-03	English	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		14	11	31	18

SECOND YEAR

Term 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
11-04	Chemistry	3	3	6	2
15-04	Physics	3	0	6	1½
14-04	Math.	5	0	10	2½
23-05	Am. Hist.	6	0	12	3
		17	3	34	9

Term 5

No.	Course	Cl.	Lab.	Pr.	Cr.
20-11	Economics	3	0	6	3
14-05	Diff. Calc.	4	0	8	4
15-05	Physics	3	3	6	4
3-01	Elec. Eng.	3	0	6	3
1-10	Surveying	4	3	5	4
		17	6	31	18

Term 6

No.	Course	Cl.	Lab.	Pr.	Cr.
20-12	Economics	3	0	6	3
14-06	Int. Calc.	4	0	8	4
15-06	Physics	3	3	6	4
3-02	Elec. Eng.	3	0	6	3
2-20	App. Mech.	4	0	8	4
		17	3	34	18

THIRD YEAR

Term 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
22-05	Am. Govt.	4	0	8	2
2-30	Pwr. Pl. Eq.	5	0	10	2½
12-04	Mach. Draw.	0	9	3	2
2-50	Prod. Proc.	5	0	10	2½
		14	9	31	9

Term 8

No.	Course	Cl.	Lab.	Pr.	Cr.
3-03	El. Impl.	4	0	5	3
2-21	App. Mech.	3	0	6	3
2-32	Heat Eng.	4	0	8	4
5-10	Ind. Mgt. I	3	0	6	3
2-40	Materials	2	0	4	2
26-05	Social Probs.	3	0	6	3
		19	0	35	18

Term 9

No.	Course	Cl.	Lab.	Pr.	Cr.
14-07	Diff. Eq.	4	0	5	3
2-22	Str. of Matls.	4	0	8	4
1-20	Hydraulics	3	0	6	3
5-11	Ind. Mgt. II	2	0	4	2
2-33	Ht. Eng.	3	0	6	3
22-06	Munic. Gov't				
	or				
23-06	Rec.Eur.His.	3	0	6	3
		19	0	35	18

FOURTH YEAR

Term 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
2-37	Htg. & Air Cond.	6	0	12	3
30-17	Literature	6	0	12	3
22-08	Cur. Pol. Iss.				
	or				
23-08	Cont. Orient	6	0	12	3
		18	0	36	9

Term 11

No.	Course	Cl.	Lab.	Pr.	Cr.
1-21	Hydraulics	3	0	6	3
2-23	Str. of Matls.	3	0	6	3
2-34	Heat Eng.	3	0	6	3
2-60	Mech. Lab.	0	3	3	2
2-10	Mechanism	0	6	6	4
24-07	Philosophy				
	or				
25-07	Psychology	3	0	6	3
		12	9	33	18

Term 12

No.	Course	Cl.	Lab.	Pr.	Cr.
2-24	Adv. Mech.	3	0	6	3
2-25	Aerodynam.	3	0	6	3
2-35	Heat Eng.	4	0	8	4
2-61	Mech. Lab.	0	3	6	3
5-14	Meth. Eng.	1	2	4	2
24-08	Philosophy				
	or				
25-08	Psychology	3	0	6	3
		14	5	36	18

FIFTH YEAR

Term 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
2-66	Mech. Lab.	3	6	9	3
30-18	Literature	6	0	12	3
30-07	Eff. Spkg.	6	0	12	3
		15	6	33	9

Term 14

No.	Course	Cl.	Lab.	Pr.	Cr.
1-46	Structs.	3	0	6	3
2-11	Mach. Des.	0	6	3	3
2-26	Eng. Dyn.	3	0	6	3
2-36	Heat Eng.	3	0	6	3
2-62	Mech. Lab.	0	4	5	3
50-01	Prof. Dev.	3	0	6	3
		12	10	32	18

Term 15

No.	Course	Cl.	Lab.	Pr.	Cr.
2-38	Pwr. Pl. Eng.	4	0	8	4
2-12	Mach. Des.	0	9	6	5
2-63	Mech. Lab.	0	4	5	3
1-47	Structs.	3	0	6	3
2-41	Metallog.	2	2	5	3
		9	15	30	18

*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Electrical Engineering

Electrical engineering is still comparatively new; it was barely two generations ago that Thomas Edison built the first central electric power station in New York City, and it was only a generation ago that the radio made its first appear-ance. In consequence, we find this branch of engineering more closely related to research in pure science than are the older branches of civil and mechanical engineering. Moreover, the tremendous developments of the past decade in theoretical physics have been largely in areas closely related to electrical engi-neering as exemplified by Radar, Amplidyne and similar tools used in World War II, so that today great opportunities for intellectual pioneering exist in this field of engineering.

The electrical industry and the field of electrical engineering are usually divided into two main branches, one having to do with electrical power and the other, communications, with the field of electronics overlapping both. The power group deals principally with large equipment and apparatus employing heavy currents; the communications group handles smaller, more delicate equip-ment employing small or even minute currents. Electrical engineering thus embraces the generation, transmission, and distribution of electricity for light and power purposes, the operation of all types of electrical equipment including telephone, telegraph, industrial electronics, radio, television and ultra-high fre-quency as well as lamps, motors, and household appliances. In addition, the field of illuminating engineering, having to do with the problems of proper light intensities, has in recent years assumed increasing importance.

Since electricity is without material embodiment and can be treated only by mathematical reasoning, the electrical engineer is frequently required to use complex higher mathematics. It is also absolutely essential that the electrical engineer who hopes to make a success of his work be able to grasp readily and absorb effectively the meaning and content of the many scientific papers having to do with research in this field. For these reasons, the program of study in electrical engineering includes more work in the pure sciences of mathematics and physics than do the other courses, as well as a solid grounding in engineering fundamentals. This is followed by a thorough study of electrical theory and its applications in the power, high voltage, and electronics fields.

The profession of electrical engineering affords a wide diversification of employment opportunities. If one is research-minded, opportunity to develop one's talents may be found in one of the great laboratories; if one is more inter-ested in plant problems, opportunity can be found in the manufacturing or operating organizations; and if one is sales-minded, he may find a career as a sales engineer.

Curriculum in Electrical Engineering

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
11-01	Chemistry	3	3	6	4
12-01	Drawing	0	6	3	3
14-01	Math.	5	0	7	4
15-01	Physics	3	0	6	3
30-01	English	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		14	11	28	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
11-02	Chemistry	3	3	6	4
12-02	Drawing	0	6	3	3
14-02	Math.	5	0	7	4
15-02	Physics	3	0	6	3
30-02	English	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		14	11	28	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
11-03	Chemistry	3	3	6	4
12-03	Drawing	0	6	3	3
14-03	Math.	5	0	10	5
15-03	Physics	3	0	6	3
30-03	English	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		14	11	31	18

SECOND YEAR

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
11-04	Chemistry	3	3	6	2
15-04	Physics	3	0	6	1½
14-04	Math.	5	0	10	2½
23-05	Am. Hist.	6	0	12	3
		17	3	34	9

TERM 5

No.	Course	Cl.	Lab.	Pr.	Cr.
20-11	Economics	3	0	6	3
14-05	Diff. Calc.	4	0	8	4
15-05	Physics	3	3	6	4
3-01	Elec. Eng.	3	0	6	3
30-17	Literature	3	0	6	3
		16	3	32	17

TERM 6

No.	Course	Cl.	Lab.	Pr.	Cr.
20-12	Economics	3	0	6	3
14-06	Int. Calc.	4	0	8	4
15-06	Physics	3	3	6	4
3-02	Elec. Eng.	3	0	6	3
2-20	App. Mech.	4	0	8	4
		17	3	34	18

THIRD YEAR

TERM 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
22-05	Am. Govt.	4	0	8	2
2-30	Pwr. Pl. Eq.	5	0	10	2½
12-04	Mach. Draw.	0	9	3	2
2-50	Prod. Proc.	5	0	10	2½
		14	9	31	9

TERM 8

No.	Course	Cl.	Lab.	Pr.	Cr.
14-07	Diff. Eq.	4	0	5	3
2-21	Appl. Mech.	3	0	6	3
2-39	Heat Eng.	3	0	6	3
3-10	D.C. Mach.	5	0	7	4
2-40	Materials	2	0	4	2
22-08	Cur. Pol. Iss.				
	or				
23-08	Cont. Orient	3	0	6	3
		20	0	34	18

TERM 9

No.	Course	Cl.	Lab.	Pr.	Cr.
3-16	Electronics	3	0	6	3
2-22	Str. Mat.	4	0	8	4
1-20	Hydraulics	3	0	6	3
3-11	Adv.A.C.Th.	3	0	6	3
3-12	E.E.Lab.D.C.	1	3	2	2
22-06	Munic. Govt.				
	or				
23-06	Rec.Eur.Hist.	3	0	6	3
		17	3	34	18

FOURTH YEAR

TERM 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-07	Effec. Spkg.	6	0	12	3
3-36	E.Eng.Math.	6	0	12	3
1-10	Surveying	8	6	10	4
		20	6	34	10

TERM 11

No.	Course	Cl.	Lab.	Pr.	Cr.
2-23	Str. Mat.	3	0	6	3
3-15	Polyphase A. C. Circ.	3	0	6	3
3-21	Electronics	3	0	6	3
3-17	Elec. Meas.	4	0	5	3
3-18	E.Meas.Lab.	0	3	6	3
24-07	Philosophy				
	or				
25-07	Psychology	3	0	6	3
		16	3	35	18

TERM 12

No.	Course	Cl.	Lab.	Pr.	Cr.
3-19	El.Fld.Theo.	3	0	6	3
3-20	Transformers Theory	3	0	6	3
3-37	Electronics	3	0	6	3
3-22	A. C. Test Lab.	1	3	5	3
3-23	Electron.Lab.	1	3	5	3
24-08	Philosophy				
	or				
25-08	Psychology	3	0	6	3
		14	6	34	18

FIFTH YEAR

TERM 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
3-24	Electronic L.	2	6	10	3
3-25	Adv.Meas.L.	0	6	12	3
30-18	Literature	6	0	12	3
		8	12	34	9

TERM 14

No.	Course	Cl.	Lab.	Pr.	Cr.
3-26	Syn. Mach.	3	0	6	3
3-27	H. F. Eng.	3	0	6	3
3-28	Trans. Lines & Ntwrk.	3	0	6	3
3-29	Ad. F'ld Th.	3	0	6	3
3-35	Ind. El. Lab.	2	2	4	3
50-01	Prof. Dev.	3	0	6	3
		17	2	34	18

TERM 15

No.	Course	Cl.	Lab.	Pr.	Cr.
3-30	Ind. Mach.	3	0	6	3
3-31	H. F. Eng.	3	0	6	3
3-32	Filters	3	0	6	3
3-33	H.Freq.Lab.	1	3	5	3
3-34	Adv. E. E. Lab.	1	3	5	3
26-05	Soc. Probs.	3	0	6	3
		14	6	34	18

*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Chemical Engineering

The field of chemical engineering is relatively new. It has grown out of the discoveries in the chemical laboratories which have served as a foundation for a great many new industries whose production processes involve chemical as well as physical changes. Petroleum refining, coal carbonization, plastics, manufacture of nylon and cellophane, and hundreds of other industries require men and women trained in chemistry as well as in engineering. Many older industries such as foods, textiles, paints and varnishes, and leather are also employing chemical engineers.

The chemical engineer has been defined as a "professional man experienced in the design, construction, and operation of plants in which materials undergo chemical and physical change." It is the duty of the chemical engineer to reduce the costs, increase production, and improve the quality of the products in the industry.

The chemical engineer must possess a working knowledge of the fundamental sciences and must understand and be able to work with people. In addition it is necessary that the chemical engineer recognize clearly the "correct appraisement of values and costs" and possess the ability to apply the knowledge possessed to the development and operation of chemical processes and plants.

In addition to the fundamental courses in chemistry, mathematics, and physics required of all engineering students, a considerable amount of time is devoted to more advanced work in chemistry as a foundation for the study of chemical technology. Instruction in the elements of mechanical and electrical engineering also gives the student a fairly broad engineering background upon which to base his study of chemical engineering unit operations. Courses of a liberal nature are included in the curriculum in order that the student may broaden his educational background. Since the field of chemical engineering is so varied, the curriculum has been designed to give the students a broad training rather than a specialized training for one specific industry. It is believed that this training will enable the students readily to acclimate themselves to whatever industry they may choose to enter.

Because of the complex nature of many chemical processes and because of the difficulty of translating laboratory results into full-scale plant operations, there has been developed in many chemical plants the so-called semi-works or pilot plant. Here new processes developed by the chemists in the research laboratory are put to the test of actual plant conditions on a small scale. And it is here that the young chemical engineers often find themselves upon graduation. If they are able to understand the chemist on the one side and the plant operator on the other, and if they are technically competent as well, they will soon find opportunities for advancement either in one of the technical branches of the industry, such as design, development, research, and production, or in the sales and management fields in which a knowledge of chemical engineering is essential.

Curriculum in Chemical Engineering

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
11-01	Chemistry	3	3	6	4
12-01	Drawing	0	6	3	3
14-01	Math.	5	0	7	4
15-01	Physics	3	0	6	3
30-01	English	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		14	11	28	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
11-02	Chemistry	3	3	6	4
12-02	Drawing	0	6	3	3
14-02	Math.	5	0	7	4
15-02	Physics	3	0	6	3
30-02	English	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		14	11	28	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
11-03	Chemistry	3	3	6	4
12-03	Drawing	0	6	3	3
14-03	Math.	5	0	10	5
15-03	Physics	3	0	6	3
30-03	English	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		14	11	31	18

SECOND YEAR

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
11-04	Chem.	3	3	6	2
15-04	Physics	3	0	6	1½
14-04	Math.	5	0	10	2½
23-05	Am. Hist.	6	0	12	3
		17	3	34	9

TERM 5

No.	Course	Cl.	Lab.	Pr.	Cr.
20-11	Economics	3	0	6	3
14-05	Diff. Calc.	4	0	8	4
15-05	Physics	3	3	6	4
11-11	Qual. Anal.	2	3	4	3
11-10	Quant. Anal.	2	3	4	3
4-41	Chem. Eng. Lit.	1	0	2	1
		15	9	30	18

TERM 6

No.	Course	Cl.	Lab.	Pr.	Cr.
20-12	Economics	3	0	6	3
14-06	Int. Calc.	4	0	8	4
15-06	Physics	3	3	6	4
2-20	Appl. Mech.	4	0	8	4
11-12	Quant. Anal.	2	3	4	3
		16	6	32	18

THIRD YEAR

TERM 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
4-01	Flow Fluids	5	3	16	4
22-05	Am. Govt.	4	0	8	2
11-09	Inorg. Chem.	4	6	8	3
		13	9	32	9

TERM 8

No.	Course	Cl.	Lab.	Pr.	Cr.
2-21	Appl. Mech.	3	0	6	3
2-32	Heat Eng.	4	0	8	4
14-07	Diff. Equa.	3	0	6	3
11-14	Quan. Anal.	3	6	6	5
26-05	Soc. Prob.	3	0	6	3
		16	6	32	18

TERM 9

No.	Course	Cl.	Lab.	Pr.	Cr.
2-22	Str. Mat.	4	0	8	4
11-30	Phys. Chem.	4	3	8	5
4-02	Ch.E.Calc.	3	0	6	3
4-24	Cost Est.	3	0	6	3
22-06	Mun. Govt. or				
23-06	Rec.Eur.His.	3	0	6	3
		17	3	34	18

FOURTH YEAR

TERM 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
30-17	Literature	6	0	12	3
4-22	Ch. E. Econ.	6	0	12	3
22-08	Cur. Pol. Iss. or				
23-08	Cont. Orient	6	0	12	3
		18	0	36	9

TERM 11

No.	Course	Cl.	Lab.	Pr.	Cr.
4-11	Unit. Oper.	4	4	10	6
11-20	Org. Chem.	3	6	6	5
11-33	Phys. Chem.	4	2	6	4
24-07	Philosophy or				
25-07	Psychology	3	0	6	3
		14	12	28	18

TERM 12

No.	Course	Cl.	Lab.	Pr.	Cr.
4-12	Unit. Oper.	4	4	10	6
11-21	Org. Chem.	3	6	6	5
11-34	Phys. Chem.	4	2	6	4
24-08	Philosophy or				
25-08	Psychology	3	0	6	3
		14	12	28	18

FIFTH YEAR

TERM 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
4-13	Unit. Oper.	3	6	9	3
30-07	Eff. Spkg.	6	0	12	3
30-18	Literature	6	0	12	3
		15	6	33	9

TERM 14

No.	Course	Cl.	Lab.	Pr.	Cr.
4-31	Ch.Pr.Dev.	0	6	6	4
3-04	Elec. Eng.	3	3	6	4
4-03	Ch. E. Ther.	4	0	8	4
11-22	Org. Chem.	3	0	6	3
50-01	Prof. Dev.	3	0	6	3
		13	9	32	18

TERM 15

No.	Course	Cl.	Lab.	Pr.	Cr.
4-21	Chem. Plts.	4	0	8	4
4-32	Ch. E. Des.	0	6	12	6
4-23	Eng. Mats.	3	0	6	3
3-05	Elec. Eng.	3	0	6	3
11-25	Qual. Organ. Analy.Lab.	0	6	0	2
		10	12	32	18

*Summer term — 5 weeks.

†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

Industrial Engineering

It has become increasingly evident that the success of a business or industrial organization, large or small, is dependent upon the skillful direction, supervision, and co-ordination of the various parts of the enterprise. The competent per- formance of these functions requires a constant supply of industrial managers well trained in the intelligent utilization of men, materials, machines, and money. Industrial engineering is the profession which supplies such individuals who, by aptitude and preparation, are able to apply engineering and scientific principles to the varied problems in the field of production management and effect solu- tions in the best interests of capital, labor, and consumer.

About sixty years ago, Frederick W. Taylor undertook to apply to the prob- lems of industrial management what we now call "the scientific method" or "the engineering approach." He reasoned that it was management's business to know what constituted a proper day's work and that the way to get the facts was through research and experiment on a scientific basis. He defined "scientific management" not as any device or scheme or gadget, but as a new outlook — a new viewpoint based upon a solid foundation of fact. The methods employed by Taylor and by those who came after him have undergone some modification, but the concept of scientific management which he formulated has gained wider and wider recognition from both employers and employees.

This growing recognition of the value of a scientific approach to the problems of industrial management early created a demand for men and women trained in engineering and science, who possessed a knowledge of business as well, to assume positions of administrative responsibility in industry. To meet this demand, courses were established in many engineering colleges to provide a thorough training in engineering fundamentals together with a specialized train- ing in business administration, which would prepare the students for managerial responsibilities in technical industries. These curricula are variously entitled industrial engineering, administrative engineering or engineering administra- tion, but all are designed to lead ultimately to positions of administrative or executive responsibility, rather than to positions which involve highly specialized engineering responsibility.

The curriculum in industrial engineering, then, provides a course of study which is essentially the same as that for mechanical engineering in the first three years. In the last two years, however, advanced engineering courses are replaced by courses in business management.

Upon graduation, the young industrial engineer may find his way into such factory staff departments as Methods Engineering, Production Planning and Control, Wage Administration, Quality Control, or Time Study. If he prefers, he may select work in Cost Accounting or Statistical Analysis; then again he may incline towards sales engineering activity and serve in the "field" as a Sales and Service representative.

More and more there is opportunity for the experienced Industrial Engineer to serve industry in a consulting capacity. Upon becoming especially skilled in his profession, he is called in by industry for assistance in the installation and maintenance of sound management principles, and in the reorganization of enterprises which have failed.

Curriculum in Industrial Engineering

FIRST YEAR†

TERM 1

No.	Course	Cl.	Lab.	Pr.	Cr.
11-01	Chemistry	3	3	6	4
12-01	Drawing	0	6	3	3
14-01	Math.	5	0	7	4
15-01	Physics	3	0	6	3
30-01	English	3	0	6	3
16-10	Phys. Tr.	0	2	0	0
		14	11	28	17

TERM 2

No.	Course	Cl.	Lab.	Pr.	Cr.
11-02	Chemistry	3	3	6	4
12-02	Drawing	0	6	3	3
14-02	Math.	5	0	7	4
15-02	Physics	3	0	6	3
30-02	English	3	0	6	3
16-11	Phys. Tr.	0	2	0	0
		14	11	28	17

TERM 3

No.	Course	Cl.	Lab.	Pr.	Cr.
11-03	Chemistry	3	3	6	4
12-03	Drawing	0	6	3	3
14-03	Math.	5	0	10	5
15-03	Physics	3	0	6	3
30-03	English	3	0	6	3
16-12	Phys. Tr.	0	2	0	0
		14	11	31	18

SECOND YEAR

TERM 4*

No.	Course	Cl.	Lab.	Pr.	Cr.
11-04	Chemistry	3	3	6	2
15-04	Physics	3	0	6	1½
14-04	Math.	5	0	10	2½
23-05	Am. Hist.	6	0	12	3
		17	3	34	9

TERM 5

No.	Course	Cl.	Lab.	Pr.	Cr.
20-11	Economics	3	0	6	3
14-05	Diff. Calc.	4	0	8	4
15-05	Physics	3	3	6	4
3-01	Elec. Eng.	3	0	6	3
1-10	Surveying	4	3	5	4
		17	6	31	18

TERM 6

No.	Course	Cl.	Lab.	Pr.	Cr.
20-12	Economics	3	0	6	3
14-06	Int. Calc.	4	0	8	4
15-06	Physics	3	3	6	4
3-02	Elec. Eng.	3	0	6	3
2-20	App. Mech.	4	0	8	4
		17	3	34	18

THIRD YEAR

TERM 7*

No.	Course	Cl.	Lab.	Pr.	Cr.
22-05	Am. Govt.	4	0	8	2
2-30	Pwr. Pl. Eq.	5	0	10	2½
12-04	Mach. Draw.	0	9	3	2
2-50	Prod. Proc.	5	0	10	2½
		14	9	31	9

TERM 8

No.	Course	Cl.	Lab.	Pr.	Cr.
3-03	El. Implem't	4	0	5	3
2-21	App. Mech.	3	0	6	3
2-32	Heat Eng.	4	0	8	4
5-10	Ind. Mgt.	3	0	6	3
2-40	Materials	2	0	4	2
26-05	Soc. Probs.	3	0	6	3
		19	0	35	18

TERM 9

No.	Course	Cl.	Lab.	Pr.	Cr.
14-07	Diff. Equa.	4	0	5	3
2-22	Str. of Mtls.	4	0	8	4
1-20	Hydraulics	3	0	6	3
5-11	Ind. Mgt.	2	0	4	2
2-33	Ht. Eng.	3	0	6	3
22-06	Munic. Govt.				
	or				
23-06	Rec.Eur.Hist.	3	0	6	3
		19	0	35	18

FOURTH YEAR

TERM 10*

No.	Course	Cl.	Lab.	Pr.	Cr.
2-37	Htg. & Air. C.	6	0	12	3
30-17	Literature	6	0	12	3
22-08	Cur. Pol. Iss.				
	or				
23-08	Cont. Orient	6	0	12	3
		18	0	36	9

TERM 11

No.	Course	Cl.	Lab.	Pr.	Cr.
1-21	Hydraulics	3	0	6	3
2-23	Str. of Mtls.	3	0	6	3
2-34	Heat Eng.	3	0	6	3
2-60	Mech. Lab.	0	3	3	2
2-10	Mechanism	0	6	6	4
24-07	Philosophy				
	or				
25-07	Psychology	3	0	6	3
		12	9	33	18

TERM 12

No.	Course	Cl.	Lab.	Pr.	Cr.
2-61	Mech. Lab.	0	3	6	3
5-15	Work Simplification	1	2	4	2
42-10	Personnel	3	0	6	3
41-07	Th.ofAccts.	4	0	8	4
20-22	Ind.Statis.I	2	2	5	3
24-08	Philosophy				
	or				
25-08	Psychology	3	0	6	3
		13	7	35	18

FIFTH YEAR

TERM 13*

No.	Course	Cl.	Lab.	Pr.	Cr.
2-66	Mech. Lab.	3	6	9	3
46-03	Contracts & Agency	6	0	12	3
30-18	Literature	6	0	12	3
		15	6	33	9

TERM 14

No.	Course	Cl.	Lab.	Pr.	Cr.
2-11	Mach. Des.	0	6	3	3
41-07	Elmts. of Cost Acctg.	2	2	5	3
20-23	Ind.Statis.II	2	2	5	3
5-17	Prod.Pl.Con.	3	0	6	3
5-16	Metd. Eng.	2	2	5	3
50-01	Prof. Dev.	3	0	6	3
		12	12	30	18

TERM 15

No.	Course	Cl.	Lab.	Pr.	Cr.
5-18	Qual. Control	3	0	6	3
41-09	Elmts. of Cost Acctg.	2	2	5	3
42-17	Prob.inPers'l	3	0	6	3
43-08	Sales Eng.	3	0	6	3
44-14	Ind. Fin.	3	0	6	3
30-07	Effec. Spkg.	3	0	6	3
		17	2	35	18

*Summer term — 5 weeks.
†All physically qualified male freshmen may elect R.O.T.C. if they so desire. Students accepted for the R.O.T.C. will not be required to take Physical Training in Terms 1, 2, 3, and will be permitted to substitute advanced R.O.T.C. courses for certain upperclass academic work as approved by the Dean up to a maximum of 18 credits.

*Members of the Pershing Rifles Drill Team, of the R.O.T.C.,
line up for inspection*

*The Art Club is a popular extracurricular activity among men
and women students*
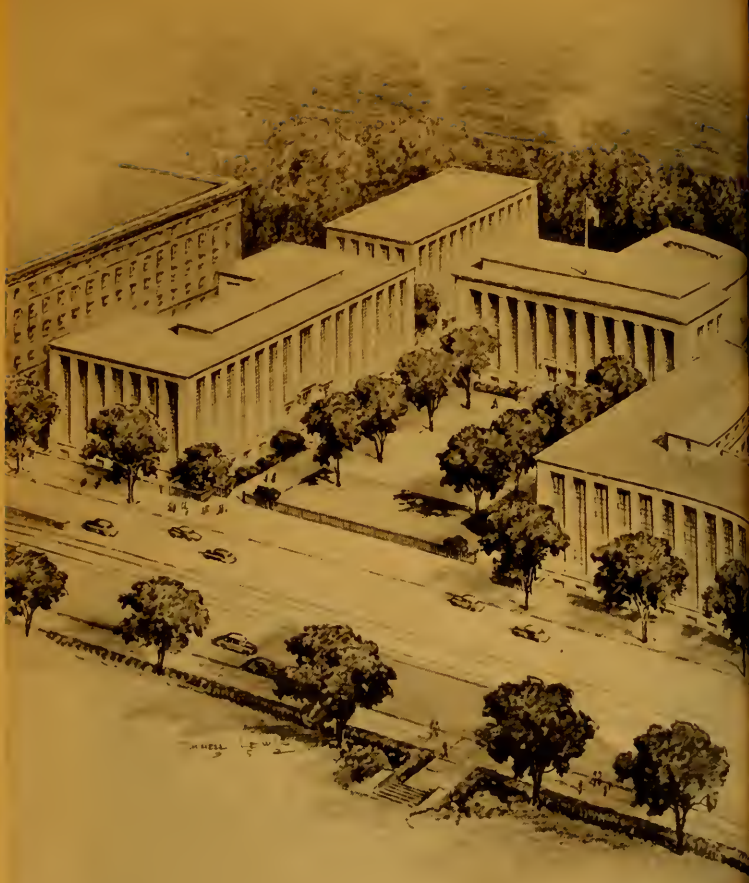
The Huntington Avenue Development as seen by the Architect
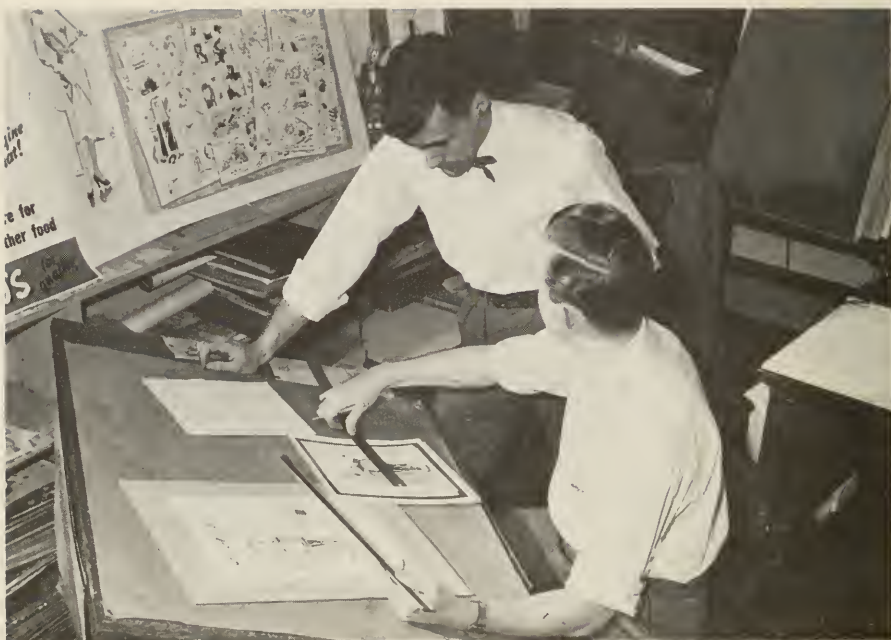
*Co-operative student gains practical experience
with an Advertising Agency*

*Northeastern's Varsity basketball team in one
of its many intercollegiate contests*

NORTHEASTERN UNIVERSITY

SYNOPSES OF

COURSES
OF INSTRUCTION

in

Education

Liberal Arts

Business Administration

Engineering

1954–1955

BOSTON 15, MASSACHUSETTS

January, 1954

Synopses of Courses of Instruction

On the pages which follow are given the synopses of courses offered in the several curricula of the Day Colleges. Although not all courses are offered every year, all will be offered during the normal period of each student's curriculum. The term "preparation" indicates a course that must be taken before undertaking the advanced course to which it applies.

A credit hour equals three clock hours of work: ordinarily one hour of class and two hours of preparation a week for a term of 10 weeks. Credit hours can be converted into standard semester hours by multiplying by $10/16$, the ratio of the number of weeks in the term to the usual number of weeks in the semester.

The University reserves the right to withdraw, modify, or add to the courses offered or to change the order or content of courses in any curriculum.

Civil Engineering

1-10 *Surveying* — This first course in surveying is divided into two portions: classroom instruction and surveying field work.

Basic surveying principles are stressed in the lecture portion of this course covering the following topics: taping, the compass, the level, differential leveling, profile leveling, the transit, closed traverse, stadia, traverse calculations and plotting of survey data.

The surveying field work portion of this course covers such topics as taping, differential leveling, running closed traverse, and the location of physical details from the closed traverse by angle and distance or by stadia. Prep. 14-03; 4 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

1-11 *Surveying* — Like course 1-10, this course in surveying is divided into two portions: classroom instruction and the drafting room.

Simple, compound and reverse horizontal curves, and spiral easement curves, both from the standpoint of a railroad curve and of a circular arc, are studied. Also included in the classroom instruction are vertical curves and earthwork solutions.

In the drafting room, data collected in the field portion of the course 1-10 are calculated as a closed traverse, plotted, and traced as a finished plan. Prep. 1-10; 4 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

1-12 *Surveying* — This course is a continuation of course 1-11 and it is divided into classroom instruction and field surveying.

In the classroom the following are studied: a review of spherical trigonometry; observations on the sun for latitude, time and azimuth; and the basic principles of photogrammetry and geodesy.

The field work consists of a random traverse being run, from which the physical details are located. A map is prepared, using collected data; a location line determined, and then the location line is staked out, with a profile of the location line being run. Prep. 1-11; 4 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

1-13 *Surveying* — This course is a continuation of the laboratory portion of course 1-12 and the following surveying problems are performed: precise and

Coast and Geodetic leveling; cross sections; earthworks calculations; mass diagram solution; plane table problems; observations on the sun for latitude, time, and azimuth; observation on Polaris for azimuth; and basic problems of photogrammetry including differential parallax measurements. Prep. 1-12; 18 Lab. Hrs.; 3 Credit Hrs.

1-20 *Hydraulics* — A basic course in hydraulics dealing with the laws of hydrostatics and hydrokinetics.

In hydrostatics the following topics are studied: pressure gauges; differential manometers; pressure intensities; total pressures; location of center of pressure (horizontally and vertically); total pressures on curved and inclined surfaces; hoop tension and end tension; simple dams; and flotation problems.

While in hydrokinetics, Bernoulli's theorem; the Venturi meter, orifices; short tubes; pipe lines; and open channel flow are studied. Prep. 2-21; 3 Class Hrs.; 3 Credit Hrs.

1-21 *Hydraulics* — This course is a continuation of course 1-20, where the following subjects are studied: equivalent pipes; the Hardy Cross method of analysis; weirs; dimensional analysis; model analysis by Froude's number and by Reynold's number; flow of fluids through closed conduits; the hydraulic jump; and the drawdown and backwater curves. Prep. 1-20; 3 Class Hrs.; 3 Credit Hrs.

1-24 *Sanitary Engineering* — This is a general course in water supply engineering where the following items are studied: forecasting the future population; the quality and quantity of water; rainfall; runoff; the collection and storage of ground water and surface water supplies; slow sand and rapid sand filters; treatment of waters for the removal of hardness, iron, and other impurities; disinfection of waters; and the distribution system. Prep. 1-21; 3 Class Hrs.; 3 Credit Hrs.

1-25 *Sanitary Engineering* — This is a companion course to 1-24. It deals with the collection and disposal of sewage and storm water, including the following items: the quantity of sewage and storm water; sewerage systems; the collection of data necessary for design and construction of collection systems; and a discussion of the modern methods of sewage treatment and the operation of these treatment plants.

The laboratory portion of this course is designed to familiarize the student with the proper methods of collecting, storing, and transporting water and sewage samples; and the basic principles of water and sewage analysis for both chemical and bacterial properties. Prep. 1-24; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

1-30 *Transportation* — This course consists of a discussion of traffic engineering, administration, surveys and plans of modern highways. The economics of highway rates of grade and general layout features, such as vertical curves, horizontal curves, superelevation, traffic control, accidents and general highway safety, are discussed.

Roadway foundations, grading and excavating equipment as well as highway drainage problems are also considered.

A study is made of soil tests and classifications. The elementary principles of soil mechanics as they are applied to highway and airport design and construction are considered.

The manufacture and testing of bituminous products as well as the construction of low cost road types (earth and gravel) and methods of soil stabilization are included. Prep. 1-12; 4 Class Hrs.; 3 Credit Hrs.

1-31 *Transportation* — A course which is a continuation of 1-30 and includes a detailed discussion of the design and construction of the higher cost types of roadways such as penetrated macadam, Portland cement concrete and asphaltic concrete pavements. A brief discussion of airport design and layout concludes the course.

The application of the latest research developments is considered throughout all phases of the material as given in both this course and 1-30. Prep. 1-30; 2 Class Hrs.; 2 Credit Hrs.

1-40 *Structural Analysis* — This, the first of a series of four courses in structural analysis, is devoted to a review and expansion of algebraic and graphical methods of determining reactions, shears, bending moments and stresses developed by loads acting upon all forms of planar and statically determinate beams and frame structures. Classes are conducted on the combined lecture and recitation basis. Prep. 2-22; 3 Class Hrs.; 3 Credit Hrs.

1-41 *Structural Analysis* — A continuation of 1-40, covering a discussion of roof loads encountered in practice and the determination of design stresses for a typical roof truss. Consideration is given to the various types of girder, simple truss and subdivided truss, highway and railway bridges embracing the treatment of dead load stresses developed in such structures. A complete study of influence lines is undertaken, together with their function in determining the shears, bending moments and stresses produced by moving load systems, both distributed and concentrated, with attention to their dynamic or impact effect. Upon conclusion of these studies a discussion of design stresses is included. Prep. 1-40; 4 Class Hrs.; 4 Credit Hrs.

1-42 *Structural Analysis* — A continuation of 1-41, covering the slope and deflection of beams and girders due to bending, by the method of work, the moment-area process, and the method of elastic weights. The deflection of statically determinate framed structures is studied by the method of work and by the Williot-Mohr process. Prep. 1-41; 3 Class Hrs.; 3 Credit Hrs.

1-43 *Structural Analysis* — Continuation of 1-42, embracing the analysis of continuous beams, simple statically indeterminate trusses and frameworks (without and with side sway) by the methods of least work, slope-deflection and moment distribution.

A study is made of the shears, moments and stresses developed in tall building frames by the various approximate methods of treatment. Prep. 1-42; 4 Class Hrs.; 4 Credit Hrs.

1-46 *Structures* — This course, designed for mechanical engineering students, comprises a study of loads and the analysis of ordinary building frames and trusses encountered in this field. The complete determination of design stresses

for a typical roof truss is carried out. Assumptions for making approximate solutions of mill building bents are considered. The use of influence lines for stress analysis under moving loads is studied. The application of influence lines to simple and overhanging beams is stressed. Maximum shears and moments due to moving, concentrated, and distributed loads are considered, as well as the absolute maximum moment in a beam. Prep. 2-23; 3 Class Hrs.; 3 Credit Hrs.

1-47 *Structures* — This course covers the basic principles and assumptions of structural design for a clearer understanding of design problems encountered in mechanical engineering. It consists of the theory and practice of designing connections for various structural elements, using rivets and welds. It also deals with the design of tension and compression members, giving consideration to direct and flexural stresses. A complete study of a plate girder for a building is made. Prep. 1-46; 3 Class Hrs.; 3 Credit Hrs.

1-49 *Concrete Testing Laboratory* — This laboratory course covers the testing (by ASTM and AASHO Standards) of Portland cement and aggregates as used in making concrete.

The physical testing of the Portland cement includes normal consistency, tensile strength, compressive strength, time of set, soundness (autoclave expansion), fineness and specific gravity.

The tests on the aggregate (fine and coarse) consist of specific gravity, absorption, sieve analysis, surface moisture, mortar-making properties, organic impurities, bulking, unit weight and abrasion loss (Los Angeles).

Concrete mix variables such as the water-cement ratio law, effect of varying percentages of sand as well as varying maximum size aggregate on the cement factor with given w/c is studied by means of laboratory exercises. Strength characteristics are determined by compression and flexural testing.

Tests are conducted by the students to study the strength-developing characteristics of the cement types. The effect of temperature and various methods of curing is undertaken as a laboratory exercise as well as a study of air-entraining cement and normal cement.

The latest developments in the field of cement technology and testing are discussed throughout the course. Prep. 2-40; 1 Class Hr.; 4 Lab. Hrs.; 3 Credit Hrs.

1-50 *Concrete* — The fundamental principles involved in the theory of reinforced concrete behavior are thoroughly reviewed and investigated, and the transformed area method of analysis and design is developed. This is followed by the application of this method to the analysis and design of elementary members such as rectangular beams, tee beams and beams reinforced in compression. Shear, bond and anchorage are also treated. In addition, a discussion of specifications and current practice is included. Prep. 2-23, 1-49; 3 Class Hrs.; 3 Credit Hrs.

1-51 *Concrete* — A continuation of 1-50, beginning with a study of the effects of diagonal tension and the design of vertical and inclined stirrups. The analysis and design of axially loaded columns on the basis of elastic behavior, followed by consideration of the influence of shrinkage and plastic flow, leading to ACI Building Code design practice. This followed by the analysis of members subjected to combined bending and axial effects. The interpretation of the ACI Building Code Requirements for Reinforced Concrete as affecting such con-

struction is carried on throughout this course. Prep. 1-50; 3 Class Hrs.; 3 Credit Hrs.

1-54 *Design of Structures* — This first course consists of lectures and problem work in the theory and practice of designing connections for various structural elements using rivets and welding. Connections with concentric and eccentric loadings are considered. Prep. 2-22; 2 Class Hrs.; 4 Lab. Hrs.; 2 Credit Hrs.

1-55 *Design of Structures* — This course, a continuation of 1-54, considers the design of moment connections for fixed ended beams. Following this, the work consists principally of the design of the individual members in a structural framework such as tension members, compression members, and flexural members. In the design of these members the effect of combined loadings is carefully considered. Shop drawings are made for the members as designed. Prep. 2-22, 1-54; 3 Class Hrs.; 6 Lab. Hrs.; 3 Credit Hrs.

1-56 *Design of Structures* — This course, the third one in the Design series, treats the complete design and drawing of a plate girder for a building or bridge. The tabular or office procedure method of design of reinforced concrete beams is developed. The design of reinforced concrete footings, both isolated and combined, are included. The design of continuous beams, both steel and concrete, concludes the course. Prep. 1-55; 9 Lab. Hrs.; 3 Credit Hrs.

1-57 *Foundation Engineering* — By means of lectures and assigned readings the following topics are considered: types of piles, pile driving equipment, pile loading capacity, marine borers, various types of caissons, cofferdams, methods of underpinning and ground water control in foundation construction. Consideration is given to dredging operations.
    The latest developments in the field of soil mechanics as related to the above topics are treated. 2 Class Hrs.; 2 Credit Hrs.

1-58 *Engineering Geology* — A study of the various methods of subsurface exploration such as borings and seismic methods is undertaken. The principal object of the material that follows these opening topics is to present the engineering application of the various topics that are included in 13-01 (General Geology). Emphasis is placed upon such topics as physical properties of the various rock types, study of subsurface waters, streams, dam sites and reservoirs, soil erosion and earth movements. Prep. 13-01; 4 Class Hrs.; 4 Credit Hrs.

1-60 *Construction Costs* — This course begins with an introduction to the organization of the construction industry and companion matters. There follows a discussion of approximate and detailed estimate of construction cost methods, both direct and indirect. Types of construction agreements by contract, day labor, etc., are examined, as well as bidding procedure. Some consideration is given to cost keeping, reports, debt retirement and depreciation as affecting costs. 3 Class Hrs.; 3 Credit Hrs.

Mechanical Engineering

2-10 *Mechanism* — Mathematical and graphical solutions of problems include angular and linear velocities, vector analysis, velocity analysis, linkages, design

of cams, transmission of motion by bodies in pure rolling contact, gears and gear tooth design, wheels in trains including gear trains and epicyclic gear combinations, drives by belt, ropes, and chains, as well as various miscellaneous motions. Prep. 2-21; 6 Lab. Hrs.; 4 Credit Hrs.

2-11 *Machine Design* — Practice is given the student in the application of theoretical principles previously studied so that he becomes familiar with the many practical details which must be considered in design work. Consideration is given to the application and design of such machine elements as keys, pins, cotters, press, shrink and friction joints, weldments, chain, and brakes. Prep. 2-24; 6 Lab. Hrs.; 3 Credit Hrs.

2-12 *Machine Design* — The theoretical and practical application of mechanics and materials to design of many machine elements including lubrication, leaf springs, helical springs, shafting, couplings, crankshafts, flywheels, spur helical and worm gearing. Dynamic loading is also used in analysis of many of the computations. Prep. 2-11; 9 Lab. Hrs.; 5 Credit Hrs.

2-20 *Applied Mechanics (Statics)* — The subjects treated are colinear, parallel concurrent and non-concurrent force systems in a plane and in space, the determination of the resultant of such systems by both algebraic and graphical means, special emphasis being placed on the string polygon method for coplanar force systems and the forces required to produce equilibrium in such systems. In addition, problems are considered involving static friction on plane surfaces; first moments and centroids of areas; second moments of areas, including related problems of radius of gyration, polar moments, product of inertia, transfer of axes, rotation of axes and principal axes. Prep. 14-05, 15-02; 4 Class Hrs.; 4 Credit Hrs.

2-21 *Applied Mechanics (Kinetics)* — Principles of first and second moments are applied to solid figures. Kinematics of motion are treated for uniform, uniformly accelerated and variable accelerated motion, including problems of translation, pure rotation, relative motion and generalized plane motion. Dynamics of rigid bodies having translation, rotation or plane motion are treated in detail. Among other topics discussed are center of percussion, work and energy, linear and angular momentum and impact. Prep. 14-06, 2-20; 3 Class Hrs.; 3 Credit Hrs.

2-22 *Strength of Materials* — This course covers the definition and discussion of unit stress and strain, the physical properties of materials, the stress-strain diagram, axially loaded members, resilience, indeterminate axial stress members, stresses in thin hollow cylinders, riveted and welded connections, torsion of circular shafts, simple beam theory including shear and bending moment diagrams, bending and shearing stresses and beam design. Prep. 2-21; 4 Class Hrs.; 4 Credit Hrs.

2-23 *Strength of Materials* — The differential equation of the elastic curve is derived and applied to varied loadings of beams by double integration and by moment-area methods. The moment-area method is further applied to indeterminate beams and to the derivation of the Theorem of Three Moments. Other topics covered are eccentric loading of compression members, combined axial and bending loads and column action in compression members. Prep. 2-22; 3 Class Hrs.; 3 Credit Hrs.

2-24 *Advanced Mechanics* — The analysis of stress at a point by analytical and graphic (Mohr's Circles) methods with emphasis on plane stress, and existing theories of failure are investigated. The results are applied to special problems such as thick hollow cylinders, shafting under combined bending and torsion, curved bars in bending, non-symmetrical bending, non-circular torsion and allied subjects leading to the applications of mechanics in machine design and other fields. Prep. 2-23; 3 Class Hrs.; 3 Credit Hrs.

2-25 *Aerodynamics* — Preliminary topics discussed are dimensional analysis, linear momentum theory, and two dimensional flow of an ideal fluid. Super-position of flow patterns are treated as preliminary to the Kutta-Joukowsky lift theorem for flow past a rotating cylinder. Extending the theory to three dimensions, the topics considered are Prandtl's vortex theory, von Karman's vortex sheet and the elementary boundary layer theory. Prep. 1-21; 3 Class Hrs.; 3 Credit Hrs.

2-26 *Engine Dynamics* — A review of the principles of momentum and impulse, both linear and angular, and of impact. Application of the momentum principles to the gyroscope and to Coriolis' law. The latter part of the course is then devoted to the discussion of vibrations, both free and forced, damped and undamped, particularly with respect to problems involving a single degree of freedom. Prep. 2-21, 14-07; 3 Class Hrs.; 3 Credit Hrs.

2-30 *Heat Engineering* (*Power Plant Equipment*) — This course is largely descriptive, and includes most of the equipment used in modern steam power plants. Particular attention is given to comparing various types of boilers, ash and coal handling systems, engines and valve gears, governing devices, turbines, condensers, feed water heaters and pumps. Gas turbines and other prime movers are compared to steam power plants. 5 Class Hrs.; 2½ Credit Hrs.

2-31 *Heat Engineering* (*Thermodynamics*) — In this introductory course in the fundamentals of thermodynamics the following subjects are discussed: general theory of heat and matter; first and second laws of thermodynamics; equations of state; fundamental equations of thermodynamics; laws of perfect gases; properties of vapors including development and use of tables and charts; thermodynamic processes of gases and saturated and superheated vapors; and the general equations of the flow of fluids. Prep. 14-06, 15-06; 3 Class Hrs.; 3 Credit Hrs.

2-32 *Heat Engineering* (*Thermodynamics*) — In this course in the fundamentals of thermodynamics, the following subjects are discussed: general theory of heat and matter, first and second laws of thermodynamics, entropy, equations of state, laws of perfect gases, properties of liquids and vapors including development and use of tables and charts, thermodynamic processes of materials and some discussion of the general equations of thermodynamics. Prep. 14-06, 15-06; 4 Class Hrs.; 4 Credit Hrs.

2-33 *Heat Engineering* — The principles of thermodynamics are applied to the following phases of heat engineering: theory of flow of gases and vapors through nozzles and orifices with and without friction; the theory of vapor engines with

emphasis on the Rankine, reheat, regenerative and binary vapor cycles, the efficiency and power calculations for actual steam boilers and engines. Prep. 2-30, 2-32; 3 Class Hrs.; 3 Credit Hrs.

2-34 *Heat Engineering (Refrigeration)* — The vapor compression system of refrigeration is studied in some detail. Enough heat transfer is given to discuss evaporator and condenser design. Low temperature cycles (multi-stage and cascade), multiple evaporator and compressor combinations, dual compression, absorption refrigeration, and controls are considered. A study of the compression of perfect gases leads to an examination of the air refrigeration cycle. Prep. 2-32; 3 Class Hrs.; 3 Credit Hrs.

2-35 *Heat Engineering (Internal Combustion Engines)* — A study is made of the internal combustion engine, including an analysis of gasoline and Diesel engine construction, cycles, combustion theory, air-fuel mixtures, carburation, detonation, valve timing, and fuels. The effect of these items on power output, efficiency and design is discussed. Although the course is mainly theoretical, consideration is given to data compiled from various research sources in the field. Prep. 2-33; 4 Class Hrs.; 4 Credit Hrs.

2-36 *Heat Engineering (Turbines)* — A study is made of the various types of steam turbines, the dynamic action of jets on moving blades, and velocity diagrams. Other topics include the calculation of efficiencies, including the influence of friction, a study of the turbine losses, lubrication, governing mechanisms, and other constructional details. The balance of the course includes problems in the design of a turbine and the principles and performance of gas turbines. Prep. 2-33; 3 Class Hrs.; 3 Credit Hrs.

2-37 *Heating and Air Conditioning* — A study is first made of the heat losses from buildings. This is followed by a detailed study of current methods of heating such buildings, including warm-air, steam and hot water systems. Auxiliaries such as boilers, stokers, oil burners, and automatic controls are considered in detail. The latter part of the course deals with central and district heating and the principles and application of air conditioning. Prep. 2-32; 6 Class Hrs.; 3 Credit Hrs.

2-38 *Power Plant Engineering* — Topics and problems taken from engineering practice are discussed to give the student an understanding of the principles and methods of analyzing power plant problems, efficiencies and costs of operation of different types of plants such as steam, hydro-electric and Diesel engines to determine the type best suited for the conditions and location involved. Prep. 2-34, 2-35; 4 Class Hrs.; 4 Credit Hrs.

2-39 *Heat Engineering* — The fundamentals of thermodynamics are discussed as follows: general theory of heat and matter; first and second laws of thermodynamics; equations of state; laws of perfect gases; properties of vapors including development and use of charts and tables; thermodynamic processes of gases; saturated and superheated vapors. These fundamentals of thermodynamics will be applied to engine cycles and power plant cycles through the use of problems. Prep. 2-30; 3 Class Hrs.; 3 Credit Hrs.

2-40 *Materials* — A study of the physical properties, composition, and to some extent the methods of production of the ferrous and non-ferrous metals and their alloys, plastics, timber, lime, cement, and concrete. Emphasis is placed on the selection of materials for actual service conditions. 2 Class Hrs.; 3 Credit Hrs.

2-41 *Metallography* — A study is made of the relation between the crystalline structures and the physical properties, the theory of crystallization, and some of the equilibrium diagrams of the ferrous and non-ferrous metals. Metallic specimens of known composition are polished, etched, examined under microscopes and by the metallograph and comparisons made with their physical properties. The effect of heat treatment on crystalline structure is also considered. Prep. 2-50; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

2-50 *Production Processes* — The techniques, processes and machines used in the manufacture and production of articles are considered. The processes covered include heat treatment, hot and cold working, welding, die casting, plastics and foundry practice. The metallurgical principles involved are correlated with these processes. The construction and operation of the air-furnace, electric arc furnace, and the cupola are discussed. 5 Class Hrs.; 2½ Credit Hrs.

2-60 *Mechanical Engineering Lab.* — A preliminary series of tests is made upon various types of apparatus used in steam power plants in preparation for more complete tests to be performed during the following course, 2-61. Tests include calibration of gages, plain slide valve setting, steam calorimeters, flow of steam through orifices, weir calibration, steam injector, friction of drives, fuel calorimeter, and flow of water in pipes. Prep. 2-33; 3 Lab. Hrs.; 2 Credit Hrs.

2-61 *Mechanical Engineering Lab.* — Complete tests are made on the following types of power plant equipment: horizontal type of steam engine, steam-driven air compressor, Curtis steam turbine, gasoline engine, triplex power pump, two-stage centrifugal pump, rotary power pump, Pelton water wheel, and air blower.
Complete reports are made describing the machine tested, method of test, results, and discussion, all in accordance with the ASME Power Test Codes. Prep. 2-34, 2-60; 3 Lab. Hrs.; 3 Credit Hrs.

2-62 *Mechanical Engineering Lab.* — Tests included in the course are Warren steam pump, unit steam heater, Carrier air conditioner, Diesel engine, steam heating boiler and hot air heater. Additional tests are conducted on materials of engineering, including tension tests on hot and cold rolled steel, torsion test, impact test and analysis of the true-stress diagram. A complete report is required of each test. Prep. 2-35, 2-23; 4 Lab. Hrs.; 3 Credit Hrs.

2-63 *Mechanical Engineering Lab.* — Tests dealing with materials of engineering include a transverse bending test on a steel beam, hardness tests on metals and compression tests on metals and woods. Tests on molding sands are made also. In addition, lubricating oils, six-stage centrifugal pump, Trane air conditioner, and CFR test engine. A report is written on each test. Prep. 2-62; 4 Lab. Hrs.; 3 Credit Hrs.

2-64 *Testing Materials Laboratory* — A detailed study is made of standard methods of inspecting and testing metals and woods of importance in structural

engineering. Tests are made to determine tensile properties, hardness, transverse strength, torsional resistance, compressive strength, column action, impact resistance and bending properties. Several non-standard tests are included to demonstrate research methods applied to specific questions. Prep. 2-23, 2-40; 1 Class Hr.; 4 Lab. Hrs.; 3 Credit Hrs.

2-66 *Mechanical Engineering Lab.* — This course consists of a study of the various methods of processing metals, and includes the study of machine tools, small tools, metal working costs, and a study of the most effective way of removing metal.

The course also includes a study of the heat treatment of tools, and the use of jigs and fixtures in the operation of modern manufacturing processes. Prep. 2-50; 6 Lab. Hrs.; 3 Credit Hrs.

Electrical Engineering

3-01 *Electrical Engineering I* — This course is designed to give a sound background in the field of Electrical Engineering and the basic principles of the theory of direct currents. Topics included are elementary circuits, electrical networks, D'Arsonnal measuring devices, and characteristics of metallic conductors. The methods of network solution included are Kirchhoff's voltage and current laws, loop and nodal equations, superposition and solutions by determinants. Practical problems are considered wherever possible making the course of general interest to Civil, Mechanical, Industrial, and Electrical Engineering students. Prep. 15-03, 15-04; 3 Class Hrs.; 3 Credit Hrs.

3-02 *Electrical Engineering* — A continuation of 3-01. It is designed to show the engineering student how d-c theory is expanded to comply with alternating current circuit conditions. The general topics covered are instantaneous voltage, current and power; effective current and voltage; average and reactive power; complex algebra and its a-c application, and sinusoidal single-phase circuit analysis. Problems basic to the general engineering field are assigned throughout the course. Prep. 3-01; 3 Class Hrs.; 3 Credit Hrs.

3-03 *Electrical Implementation* — The purpose of this course is to familiarize the non-electrical engineering student with various electrical devices. Ever-expanding use of these devices in all branches of engineering has indicated this need. Three-phase electric circuits and magnetic-circuit theory are covered; and these principles, along with those covered in 3-01 and 3-02, are used in considering transformers, induction and synchronous motors, and alternators. Basic electronic theory is then presented, for the purpose of acquainting the student with automatic control systems. Prep. 3-01, 3-02; 4 Class Hrs.; 3 Credit Hrs.

3-04 *Electrical Engineering* — This course is designed to meet the needs of the chemical engineering students in the application of electrical engineering to industrial processes. Basic d-c and a-c circuit theory is studied as well as the elementary theory of d-c and a-c machines. Involved also is a study of the characteristics and associated circuits of industrial type electronic devices, including the high-vacuum diode and triode, the thyratron and ignitron tubes, and photo-electric tubes.

A laboratory course accompanies the lecture course, and the experiments include work on d-c and a-c circuits, resonant conditions, diode and triode characteristics, rectification and filtering, amplifiers, and the characteristics and use of photo-tubes. Prep. 15-03, 15-04; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

3-05 *Electrical Engineering* — This course is a continuation of 3-04 and develops the application to industrial processes of those devices studied in the previous course. Included for consideration are the operating characteristics of d-c motors and generators, the ignitron and thyratron polyphase rectifiers, induction and dielectric heating, as well as the control and regulation of motor speed and generator voltage. A laboratory demonstration period accompanies the lectures. Prep. 3-04; 3 Class Hrs.; 3 Credit Hrs.

3-10 *D. C. Machinery* — This course deals with the principles of d-c machinery, including armature windings, commutation, armature reaction, losses, ratings, excitation methods, and operating characteristics of shunt, series, and compound generators. The principles of operation of d-c motors are also investigated with emphasis on shunt, series, and compound characteristics, stray power, efficiencies, ratings and applications. Attention is also given to auxiliary protective and control devices. Prep. 3-01, 3-02; 5 Class Hrs.; 4 Credit Hrs.

3-11 *Advanced A-C Theory* — This course involves the consideration of non-sinusoidal wave form analysis, mututal induction and the air-core transformer, Laplace transformation theory and application to transient phenomena occurring in d-c and a-c linear circuits. Prep. 3-02; 3 Class Hrs.; 3 Credit Hrs.

3-12 *Electrical Engineering Laboratory D. C.* — This laboratory course is designed to aid the student in developing his ability to conduct tests of an engineering nature as well as to write and submit engineering reports. The experiments follow closely the material of 3-10. Included are experiments on generator (1) armature and field resistance measurements, (2) shunt and compound loading characteristics study and (3) parallel operation methods. Load tests on shunt and series motors are included along with three methods of approximating true load conditions, namely, the stray power method, Kapp opposition method and the retardation method of division of losses. Prep. 3-10; 1 Class Hr.; 3 Lab. Hrs.; 2 Credit Hrs.

3-15 *Polyphase A. C. Circuits* — This course deals with polyphase circuits. Voltage, current, and power relations in polyphase circuits are studied in detail with emphasis on three-phase circuits. Both balanced and unbalanced conditions are considered. Particular attention is given to the methods of measuring three-phase power and to the application of symmetrical phase components to the solution of unbalanced polyphase circuits. Prep. 3-11; 3 Class Hrs.; 3 Credit Hrs.

3-16 *Electronics* — This is an introductory course in electron tubes and is concerned with the motion of electrons in electric and magnetic fields, thermionic emission, static and dynamic vacuum tube characteristics, equivalent circuit methods, and graphical solutions. The object of the course is to give the student a thorough knowledge of the basic construction and operation of thermionic vacuum tubes and to demonstrate the mathematical and graphical procedures used in solving circuit problems. Prep. 3-36; 3 Class Hrs.; 3 Credit Hrs.

3-17 *Electrical Measurements* — One purpose of this course is to acquaint the student with the theory of precision measure as applied to electrical measurements. The parts and theory of operation of resistance devices, galvanometers and indicating instruments are studied. Also included is a discussion of the methods of measuring various electrical quantities such as resistance, conductance, electromotive force, and current. The methods of measuring capacitance, inductance, a-c power and energy are given detailed treatment including a study of the standards which apply. The course then consists of a study of the construction, theory of operation, methods of use, sources of error, etc., of the types of measuring instruments used in commercial and standardizing laboratories. Prep. 3-02, 14-07; 4 Class Hrs.; 3 Credit Hrs.

3-18 *Electrical Measurements Laboratory* — This course emphasizes the theory of 3-17. Measurement of all the general types of impedances as well as very low resistance is included. The standardization, test and calibration of the more basic instruments give the student practical training in the use of precision measure. Experiments on networks familiarize the student with the more common laboratory equipment. Prep. 3-17; 3 Lab. Hrs.; 3 Credit Hrs.

3-19 *Electromagnetic Field Theory* — This course is designed to equip the student with a working knowledge of electromagnetic theory. It covers four principle topics: electrostatics, magnetostatics, rector analysis, and Maxwell's equations. Included under these general headings are such items as Gauss' law, the law of Biot and Savart, the equation of continuity. Much use is made of rector analysis which is essential for obtaining the solutions of practical problems. Prep. 3-36; 3 Class Hrs.; 3 Credit Hrs.

3-20 *Transformer Theory* — A detailed study of the construction, theory and characteristics of transformers, with emphasis given to their use in power circuits. Both single-phase and polyphase applications are considered and special types such as the autotransformer and instrument transformers are included. Prep. 3-15; 3 Class Hrs.; 3 Credit Hrs.

3-21 *Electronics* — This course is a detailed study of the design, calculation and operation of vacuum tube circuits. Among the topics considered are voltage amplifiers, cathode followers, inverse-feedback circuits, and class A power amplifiers. Problems are solved involving practical circuits and the student acquires practice in both equivalent circuit and graphical methods of solution. Prep. 3-16; 3 Class Hrs.; 3 Credit Hrs.

3-22 *A. C. Test Laboratory* — This is a laboratory course designed to present tests on alternating current circuits and transformers at power frequencies. It includes tests on series and parallel R, L, C circuits, resonance, power measurements by the two-wattmeter and polyphase-wattmeter methods, load and opposition tests on transformers, polyphase transformer connections, and the constant-current transformer. Prep. 3-15, 3-20; 1 Class Hr.; 3 Lab. Hrs.; 3 Credit Hrs.

3-23 *Electronic Laboratory* — The experiments performed in this course are based upon material given in 3-16. They include the determination of static and dynamic vacuum tube characteristics, tube constants, and the performance of tubes in amplifiers and similar circuits. Emphasis is placed upon checking experi-

mental results with those obtained by calculation. Prep. 3-16, 3-21; 1 Class Hr.; 3 Lab. Hrs.; 3 Credit Hrs.

3-24 *Electronic Laboratory* — The experiments in this course deal with measurements at radio frequencies. The types of apparatus experimented upon include a typical superheterodyne receiver, detectors, class C amplifier, reactance modulator, discriminator, coaxial line, and matching networks. The student acquires practice and experience in using test equipment such as primary and secondary frequency standards, cathode-ray oscilloscopes, vacuum-tube voltmeters, frequency meters and wave analyzers. Prep. 3-21, 3-23; 2 Class Hrs.; 6 Lab. Hrs.; 3 Credit Hrs.

3-25 *Advanced Measurements Laboratory* — A continuation of 3-18. The experiments give the student an opportunity to study and operate the more advanced and refined high frequency bridges, receivers, oscillators, vacuum tube voltmeters and audio frequency wave analyzers. Also included are studies on filters, artificial lines, audio transformers and vacuum tube voltmeters, phototubes and wavemeters. Prep. 3-13, 3-17, 3-18; 6 Lab. Hrs.; 3 Credit Hrs.

3-26 *Synchronous Machinery* — A course dealing with the construction, general theory, and operating characteristics of synchronous machines, with emphasis on their use as synchronous generators and synchronous motors. Operating problems encountered when these machines are connected in parallel are given careful consideration. Prep. 3-20; 3 Class Hrs.; 3 Credit Hrs.

3-27 *High Frequency Engineering* — The first part of this course will deal with vacuum tube oscillators and will include criterion for oscillation, various types of oscillators, and frequency stabilization. The latter part of this course deals with AM and FM receivers and will include the theory of amplitude and frequency modulation and detection. Prep. 3-37; 3 Class Hrs.; 3 Credit Hrs.

3-28 *Transmissions Lines and Networks* — This course deals with the fundamental principles of transmission lines and networks in the steady state. Reflection phenomena are considered with various terminations including open and short-circuit conditions. Included in the discussion are a consideration of insertion loss and iterative and image impedance connections. Equivalent T and Pi networks are considered in detail. Prep. 3-19, 3-11; 3 Class Hrs.; 3 Credit Hrs.

3-29 *Advanced Field Theory* — This course is a continuation of 3-19 Electromagnetic Field Theory. Maxwell's equations are applied to wave propagation, reflection, radiation, wave guides, and antennas. Prep. 3-19; 3 Class Hrs.; 3 Credit Hrs.

3-30 *Induction Machinery* — This course is a continuation of 3-26. It deals with single-phase and polyphase induction motors and induction generators but includes a study of series and repulsion motors.

The method of symmetrical phase components is applied to the study of the effect of unbalanced condition on the operation of induction motors. Prep. 3-26; 3 Class Hrs.; 3 Credit Hrs.

3-31 *High Frequency Engineering* — This course will cover the pulse circuits commonly used in television, radar, pulse modulated communication systems, and digital computers. The latter portion of the course will deal with the rela-

tively new topic of transistors. The physics of transistors will be treated as well as a study of circuits employing transistors. Prep. 3-27; 3 Class Hrs.; 3 Credit Hrs.

3-32 *Filters* — This course considers in detail the four principal types of filters (low-pass, high-pass, band-pass and band-elimination) in their constant-k and m-derived forms. Design and performance are considered, including the design of composite filters properly terminated. Lattice structures are considered together with their transformations to T or bridged-T sections. Prep. 3-28; 3 Class Hrs.; 3 Credit Hrs.

3-33 *High Frequency Laboratory* — The experiments included in this course cover the pulse circuits, UHF and microwave components, commonly employed in pulse-type equipment such as television, pulse-modulated communication systems, and radar. Typical of the devices and circuits studied are klystrons, wave guides, parabolic reflectors, resonant cavities, resonant-line oscillators, pulse-forming and delay lines and the phantastron-delay circuit. Prep. 14-07, 3-19, 3-29, 3-27; 1 Class Hr.; 3 Lab. Hrs.; 3 Credit Hrs.

3-34 *Advanced Electrical Engineering Laboratory* — In this laboratory course, tests are performed on several types of alternating current motors and generators. The tests are varied from year to year. Typical experiments are a load test on a polyphase induction motor, load test on a brush-shifting induction motor, V-curve and efficiency test on a synchronous motor, determination of the voltage regulation of a synchronous generator by the American Standards Association Method and finding the efficiency of a synchronous generator from no-load tests. Prep. 3-26, 3-30; 1 Class Hr.; 3 Lab. Hrs.; 3 Credit Hrs.

3-35 *Industrial Electronics Laboratory* — This laboratory course is designed to show the application of electronic control and regulation devices as applied to industrial processes. It also embraces the elements of Servomechanisms using the Laplacian mathematical approach. A study is made of regulation of the voltage of d-c generators and the speed of d-c motors, the behavior of electro-mechanical servomechanism systems, induction heating and polyphase power rectifier action involving the use of ignitron and thyraton tubes. Prep. 3-11, 3-37; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

3-36 *Electrical Engineering Mathematics* — This course continues the study of ordinary linear differential equations started in 14-07, and offers the basic principles of partial differential equations. Special emphasis is placed upon the forms of the solutions of Laplace's equation and the wave equation in various co-ordinate systems. Also included is an introduction to operational calculus with application made to the solution of representative electrical circuits and mechanical systems. Prep. 14-07; 6 Class Hrs.; 3 Credit Hrs.

3-37 *Electronics* — The content of this course may be divided into two groups: r-f voltage amplifiers, and r-f power amplifiers. The first group includes the design and analysis of tuned circuits, tuned coupled circuits, staggered tuning, narrow band amplifiers, and broad band amplifiers. The second group includes the design and analysis of class C and class B r-f power amplifiers, neutralization of triode tuned power amplifiers, and frequency multipliers. Prep. 3-21; 3 Class Hrs; 3 Credit Hrs.

Chemical Engineering

4-01 *Flow of Fluids* — The effects of system dimensions, operating variables and physical properties of the fluids on the power consumption for flow of both incompressible and compressible fluids are studied. Methods for the determination of optimum economic conditions are presented. Flow meters are evaluated and brief reference is made to non-Newtonian flow, two phase flow and fluidized systems. Laboratory work is included in the course. Prep. 15-02; 5 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

4-02 *Chemical Engineering Calculations* — This is a problem course in which the tools of stoichiometry, such as common basis, energy and material balances, are applied to typical industrial calculations. Problems are assigned dealing with the combustion of fuels, dilutions metering, drying, flame temperature, and recycling processes. Considerable attention is devoted to the use of ratios and the common basis method of relating various systems, as these procedures are of particular value to the chemical engineer. Prep. 11-12, 11-14; 3 Class Hrs.; 3 Credit Hrs.

4-03 *Chemical Engineering Thermodynamics* — Fundamental concepts, development of the first two laws, and both expansion and compression are reviewed. Equations are developed expressing the thermodynamic functions in terms of system variables. These equations are utilized to develop charts and tables of the thermodynamic functions required for estimation of heat and work effects. The energy and state changes associated with steady and unsteady state, non-cyclic flow processes are considered in detail. Liquid-vapor equilibrium relationships are developed for ideal and non-ideal systems. The effects of the fundamental variables on reaction yields the third law, and the relationship between free energy and spontaneity of reaction, are studied with emphasis on industrial application. Prep. 2-32, 14-7; 4 Class Hrs.; 4 Credit Hrs.

4-11 *Unit Operations* — This course consists of a study of the mechanical operations peculiar to the chemical industry. The unit operations studied are flow of heat, evaporation and air conditioning. Experiments are performed on small-scale plant equipment that has been specially designed or selected for the purpose. Detailed reports are required. Prep. 4-01, 4-02; 4 Class Hrs.; 4 Lab. Hrs.; 6 Credit Hrs.

4-12 *Unit Operations* — This course is a continuation of 4-11. The unit operations studied are drying, distillation, gas absorption, extraction and crystallization. Experiments are performed in the laboratory on the unit operations studied. Prep. 4-01, 4-02; 4 Class Hrs.; 4 Lab. Hrs.; 6 Credit Hrs.

4-13 *Unit Operations* — This course is a continuation of 4-12. The unit operations studied are filtration, mixing, crushing and grinding, size separation and conveying. Laboratory experiments are performed. Prep. 4-01, 4-02; 3 Class Hrs.; 6 Lab. Hrs.; 3 Credit Hrs.

4-21 *Chemical Plants* — The primary object of the course is to acquaint the student with the technology of the basic organic and inorganic chemical industries. Schematic flow sheets are presented and the chemistry, thermodynamics and economics of the processes are considered, together with any unique equipment features.

The last few weeks are devoted to presenting the basic principles of reaction kinetics and their application in the design of simple flow and non-flow type reactors.

Plant inspection trips serve to give realism to the classroom discussions. Prep. 11-20; 4 Class Hrs.; 3 Credit Hrs.

4-22 *Chemical Engineering Economics* — The fundamentals of economics and statistics previously acquired by the student are specifically applied to raw materials, markets, labor, power, fuel, water, transportation and similar economic factors as related to the chemical industry. Laws relating to waste disposal, nuisance and patents are discussed. Prep. 20-21; 6 Class Hrs.; 3 Credit Hrs.

4-23 *Engineering Materials* — A study of the properties of materials which chemical engineers utilize in their work. The effect of composition, heat treatment and mechanical work upon the physical properties of metals and their alloys is emphasized. Other materials are studied in a similar manner. Prep. 11-14; 3 Class Hrs.; 3 Credit Hrs.

4-24 *Cost Estimation* — Application of current information to the estimation of the cost of new plants and the cost of operation of new processes. An introduction to accounting techniques and the analysis of financial statements precedes the discussion of cost finding systems. The cost of a plant to carry out a specific process is estimated and this is followed by the estimation of the cost of operation of the plant. 3 Class Hrs.; 3 Credit Hrs.

4-31 *Chemical Process Development* — This course attempts to teach the fundamentals of research by determining the optimum conditions for carrying out some unit process. After a survey of the literature has been made, a research plan is formulated. Variables are noted and their effect on the chemical process determined through laboratory experiments. The writing of reports is an essential feature of the course. Prep. 4-11, 4-12; 6 Lab. Hrs.; 4 Credit Hrs.

4-32 *Chemical Engineering Design* — The design of equipment of commercial size forms the basis of the course. Design data are taken from the literature when it is available. Other data are obtained by experiment on small-scale industrial equipment in the laboratory. From these data and information acquired in previous courses, the commercial scale equipment is designed. Students qualified by industrial experience are sometimes assigned problems suggested by their co-operative employer which are worked out under the joint supervision of the plant engineers and the members of the staff. Prep. 4-11, 4-12; 6 Lab. Hrs.; 6 Credit Hrs.

4-41 *Chemical Engineering Literature* — This course introduces the student to sources of information available to chemical engineers. Prep. 11-04; 1 Class Hr.; 1 Credit Hr.

Industrial Engineering

5-10 *Industrial Management* — The administrative and managerial aspects of office and plant operation are given thorough treatment in this course. Emphasis is placed upon such managerial functions as selection of the factory location and

factory machines and the maintenance of equipment; plant layout and materials handling; standardization, work simplification and time study; design and inspection of the product; material control and procurement; production planning and control. The course is designed to bring to the student an understanding of the problems facing management today. 3 Class Hrs.; 3 Credit Hrs.

5-11 *Industrial Management* — This course deals with the managerial functions of a business in respect to the labor relations and budgetary control. Subjects covered in detail include the proper selection and training of personnel; labor relations policies — good and bad; wage and salary administration; job evaluation and merit rating; budgetary and cost control. At no time is the student permitted to lose sight of the impact of these managerial activities upon the type of labor-management relations which exist within the plant. Prep. 5-10: 2 Class Hrs.; 2 Credit Hrs.

5-14 *Methods Engineering* — This course is designed for students in Mechanical Engineering to show the proper use of work simplification and time study. The student is instructed in the use of process analysis, operation analysis, man-machine analysis, and micromotion analysis. This is accomplished through lectures, discussions and actual laboratory projects.

Time study is discussed and the student is instructed in its correct use and how this tool can be used as an aid to management. Prep. 5-10; 1 Class Hr.; 2 Lab. Hrs.; 2 Credit Hrs.

5-15 *Work Simplification* — This course presents in detail the functions of the factory staff department commonly known as the Methods Department. These include process analysis through the use of process charts and flow diagrams; the principles and technique of plant layout; operation analysis through the use of operation charts, man-and-machine charts, and micromotion study; the application of the principles of motion economy to all phases of factory operation, clerical and mechanical.

Complete laboratory facilities provide opportunity for the student to apply the subject matter of the course to a typical factory operation set up for this purpose.

This course is designed for students in Industrial Engineering. Prep. 5-10; 1 Class Hr.; 2 Lab. Hrs.; 2 Credit Hrs.

5-16 *Methods Engineering* — A discussion of wage incentive plans paves the way for a thorough understanding of the other topics treated in detail; relation of time study to motion study and micromotion study; time study technique and procedure; performance rating, development of the concept of "normal," use of personnel, fatigue, delay, and other allowances; the analysis of data; treatment of variables, and the preparation of standard data; setting job and element standards directly from time study versus the use of standard data; industrial relations problems connected with the application of time-studied wage incentive plans. Prep. 5-15; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

5-17 *Production Planning and Control* — This course deals with the highly important "operating management" activity of planning and controlling the flow of materials through the shop, and the utilization of the equipment and manpower to best advantage.

Included in the course is the following subject matter: factory organization, factory planning and layout, nomenclature, stores keeping control, development and engineering, planning procedure, scheduling, routing, dispatching, the use of special control charts and boards, forecasting and budgeting. Prep. 5-10; 3 Class Hrs.; 3 Credit Hrs.

5-18 *Quality Control* — The materials presented in this course are designed to give the student a working knowledge of the theory behind the control chart method and an appreciation of its use. The subject matter includes funda-mentals of quality control, theory of control charts, analysis of control chart data, sampling methods, control chart applications, the Poisson distribution, planning for statistical quality control, acceptance sampling, control chart tech-niques, and industrial applications. Prep. 20-22; 3 Class Hrs.; 3 Credit Hrs.

Biology

10-01 *General Biology* — The properties of protoplasm, cells and cell division; basic tissues of plants and animals; introduction to the science of plant life, including a study of the thallophytes, bryophytes, pteridophytes, and sperma-tophytes from the point of view of their morphology and life histories of repre-sentative examples; economic importance of these groups is considered; the form and structure of plant cells; consideration of osmosis and diffusion; dis-cussions of the morphology and physiology of the root, stem, and leaf, together with an account of the factors affecting and effecting the absorption and trans-location of foodstuffs. The laboratory periods are devoted to experiments and the study of specimens, models, and slides which parallel the lecture materials. 2 Class Hrs.; 3 Lab. Hrs.; 3 Credit Hrs.

10-02 *General Biology* — Photosynthesis; plant metabolism, the carbon, nitro-gen, and hydrologic cycles; flower parts and functions; discussions of the methods of reproduction in plants and animals including binary fission, sporulation, sexual and metagenesis, physiological division of labor; selected life histories of the invertebrate groups; their basic structural characteristics; economic impor-tance, classification and distribution of common representatives. The labora-tory will include the classification and underlying principles of morphology and physiology of these groups of living material. Prep. 10-01; 2 Class Hrs.; 3 Lab. Hrs.; 3 Credit Hrs.

10-03 *General Biology* — Discussions of the vertebrate groups including the physiology and structural characteristics of the reproductive, digestive, circula-tory, respiratory, excretory, nervous, muscle, and skeletal systems; transporta-tion and utilization of the main varieties of tissues; classification of the verte-brate groups; a study of gametogenesis, elementary exposition of heredity and embryology. The laboratory will include morphological and physiological studies by dissections on the frog and experiments on fundamental physiological concepts. Prep. 10-02; 2 Class Hrs.; 3 Lab. Hrs.; 3 Credit Hrs.

10-04 *General Biology* — Distributional factors and an account of the basic principles of plant and animal ecology; discussions of organic evolution and its implications. The laboratory will consist of parallel studies using models,

charts, and slides; some field work will be undertaken. Prep. 10-03; 3 Class Hrs.; 3 Lab. Hrs.; 2 Credit Hrs.

10-06 *Biology and Society* — The exposition and analysis of basic biological concepts and their relationship to the structure of human society. The genetic basis of human differences and an analysis of the several environmental factors common to all living organisms in their specific relationships to man. A survey is made of the more significant recent biological principles and the relation they hold to the social and economic welfare of man. 5 Class Hrs.; 2½ Credit Hrs.

10-09 *Evolution* — A consideration of the theories of the origin of life and its diversity. Early concepts are discussed together with Darwinism, and Neo-Darwinism. Emphasis is placed upon the importance of homology, taxonomy, paleobiology, embryology, morphology, and genetics as supportive evidence for organic change. 5 Class Hrs.; 2½ Credit Hrs.

10-20 *General Bacteriology* — The biology of microorganisms, emphasizing the bacteria. The course deals with the preparation of media, the methods of sterilization, staining, isolation and identification of pure cultures together with studies on the biochemical activities and effects of physical agents. The laboratory studies are correlated closely with lecture topics and serve to develop in the student the proper technique of handling, observing and working with non-pathogenic microorganisms. Prep. 10-04; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-21 *General Bacteriology* — An introduction to the bacteriology of water, sewage, air and milk. The course includes a consideration of standards, plate counts and physiological tests for water and milk; a bacterial analysis of air and the treatment and proper disposal of sewage. The laboratory illustrates the types, names, chemical reactions and prevalence of organisms associated with each aspect of the course as revealed from actual samples collected by the student. Prep. 10-20; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-40 *Physiology* — A course in human physiology including the study of protoplasm and life processes, enzymes, tissues, translocation and utilization of materials; control of tissue activity; the study of the circulatory, respiratory and digestive systems; protein, carbohydrate and fat metabolism. The laboratory work consists of blood counts, hemoglobin determination, tests for blood, hemolysis, dissections of organs; general and specific tests for proteins, carbohydrates and fats. Prep. 10-55; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-41 *Physiology* — A course in muscle-nerve physiology, physiological properties of nerves, neuro-anatomy of the spinal cord and brain, the physiology of the central and peripheral nervous system, autonomic nervous system; the special senses organs; the excretory, endocrine and reproductive systems. The laboratory consists of practice of the use of apparatus, with experiments on muscle-nerve stimulation, urinalysis and the special senses. Prep. 10-40; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-55 *Comparative Vertebrate Anatomy* — The development and significance of the structural and physiological changes in the chordate groups; homology, analogy, metamerism, cephalization; general features of embryological develop-

ment of the chordates, particularly that of man; the basic principles of phyllo-genesis, the geological time scale provide a broad background for the interpreta-tion of the significant morphological changes occurring in the exoskeleton, endoskeleton and muscle systems. Amphioxus or Ammocoetes, the shark and other forms are studied concurrently in the laboratory affording a comparative treatment. Prep. 10-02; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-56 *Comparative Vertebrate Anatomy* — Continued discussions of the com-parative anatomy and general treatment of the embryological and phylogenetic development of the digestive, circulatory, respiratory, excretory, reproductive and nervous systems, tracing the chief evolutionary and ontogenetic sequences of these systems in the main vertebrate classes. The laboratory work consists of a detailed dissection of the systems of the mammal. Prep. 10-55; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-59 *Animal Histology* — A study of the normal microscopic anatomy of the tissues and organ systems of the body, including studies of the microscopic anatomy of cells, cell division, cytomorphosis and cell differentiation. A general survey of the characteristics of the main varieties of tissues and detailed studies of the morphology and function of epithelial, connective and vascular tissues. The laboratory periods are used in the study of selected slides and a general introduction to the principles of microscopy. Prep. 10-56; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-60 *Animal Histology* — Further considerations of the microscopic anatomy of animals by a study of characteristics and functions of muscle and nervous tissues with the histology of the lymphatic, vascular, digestive, endocrine, reproductive and sense organs. The laboratory work consists of continued studies of slides illustrating the cellular characteristics of tissues and systems. Prep. 10-59; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-61 *Embryology* — The descriptive embryogeny of Amphioxus and the morphological development of the organ systems in the chick, pig and man, principles of embryonic development are discussed with topics on histogenesis, organogenesis and the consideration of factors influencing development. A detailed study is made in the laboratory of organogenesis in the chick by means of serial sections, whole mounts and models representing significant stages of early development. Prep. 10-56; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-62 *Embryology* — The development of man including the subjects of sperma-togenesis and oögenesis; the endocrine factors influencing ovulation; the deter-mination of sex; the period of the ovum, blastulation and gastrulation; develop-ment and functional significance of the foetal membranes and circulation, and consideration of the embryology of the several systems of the body. The labora-tory periods are devoted to a study of organogenesis in the pig with demonstra-tions of significant stages of human development. Prep. 10-61; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-65 *Genetics* — The study and discussion of variation, the laws of inheritance as found in animals and plants, and their application to human relations, includ-ing the observational, experimental, cytological, statistical and developmental

approaches. The laboratory includes methods of culturing, handling and experimental crossing of *Drosophila*. Prep. 10-04; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-66 *Genetics* — A detailed study of the gene and its physiological aspects in relation to development and behavior. The consideration of population genetics and evolution. The laboratory work includes an extension of the work on *Drosophila* and a statistical analysis of data. Prep. 10-65; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-69 *Histological Technique* — The fundamentals of histological technique, by laboratory means, introducing the student to the general methods of tissue preparation for purposes of microscopic study. The preparation of solutions and stains, the microtome and its operation together with specific directions for fixation, clearing, hardening, embedding, section-cutting and staining of tissues. Prep. 10-60; 6 Lab. Hrs.; 2 Credit Hrs.

10-70 *Histological Technique* — Practical application of the basic principles of tissue preparation and sectioning with exercises on the preparation of several tissues of the animal body portraying the qualities of selected stains and their combinations. Directions for affixing sections, mounting, labeling are given the student. Prep. 10-69; 6 Lab. Hrs.; 2 Credit Hrs.

10-71 *History of Biology* — An historical survey of the development, trends, and theoretical principles of biological thought. The purpose is to present, as inclusively as possible, the progressive development of biology, emphasizing the specific contributions that have been made, beginning with the philosophers of Greece and Babylonia and Rome, continuing in sequence through the Middle Ages, the Renaissance and the eighteenth, nineteenth and twentieth centuries. 4 Class Hrs.; 4 Credit Hrs.

10-72 *Biological Literature* — Original sources of biological information with practice in the use of abstracting journals and methods of reference filing. 5 Class Hrs.; 2½ Credit Hrs.

10-80, 10-81 *Senior Research* — Experimental work in biology under the direction of staff members. Approval of department head necessary. Each course carries 2 to 4 hours credit and extends through a single term.

10-82, 10-83 *Seminar* (*Biology* — Discussion of the development, trends, and theoretical principles of biological thought. Approval of department head necessary. 2 Class Hrs.; 1 Credit Hr. (each term).

10-100 *Taxonomy of Seed Plants* — Phylogenetic study of flowering plants; relationship of the principal orders and families; problems of nomenclature; identification of specimens. The laboratory will include field trips for the study and collection of native plants. Stress will be placed upon the native fall flora. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-101 *Taxonomy of Seed Plants* — A continuation of 10-100. Stress will be placed upon the native spring flora. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-102 *Protozoology* — The classification, morphology, life cycles of the various groups of protozoa, with emphasis on parasitic organisms. The laboratory will

include an examination of representatives of the various groups, and the collection and preparation of research material. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-103 *Helminthology* — The classification, morphology, and life cycles of the Trematoda, Cestoda, and Nematoda, with emphasis on medically important forms. The laboratory will be concerned with the study of various stages in the life cycles of members of the different groups, and the techniques involved in the collection and preparation of research material. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-104 *Medical Entomology* — Consideration of the classification, morphology, life cycles, ecology, and control of arthropods which are involved in the transmission of parasitic diseases. The laboratory will include the identification of various forms, and the collection and preparation of research material. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-105 *Cytology* — The structure of the cell and of protoplasm considered in relation to general functions; cytogenetics, and the cytology of nuclear phenomena. The laboratory will consist of the preparation of slides using special cytological techniques. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-106 *Experimental Embryology* — The experimental analysis of causal factors controlling the development of form and function during maturation, fertilization, cleavage, growth, and differentiation. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-107 *Mammalogy* — Biology of mammals emphasizing those forms inhabiting North America. Considering their phylogeny, morphology, characteristics, and classification together with discussion of ecological relations, and factors influencing distribution and numbers in economic value. A survey of pertinent mammalian literature. Methods of collecting and preserving specimens. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-108 *Ornithology* — A phylogeny of birds with discussions relating to the characteristics of modern representative orders. Ecology, distribution; migration, economic relationships of North American forms as included. Weekly field trips devoted to bird identification will be conducted. 3 Class Hrs.: 3 Lab. Hrs.; 4 Credit Hrs.

10-109 *Plant Ecology* — A study of the environmental factors influencing the establishment and the maintenance of the flora of North America. Consideration of the important concepts of modern Plant Ecology by the study of succession and the climax formation of major plant communities. 4 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-110 *Animal Ecology* — A consideration of the relationships to animals to their environment primarily of their historical background in ecology and a survey of limiting factors in the environment, community organization and the population dynamics. Laboratory will be used to supplement theoretical considerations. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

10-120, 10-121, 10-122, 10-123, 10-124, 10-125, 10-126, 10-127 *Thesis* — Experimental problem. Carried continuously through eight consecutive terms. (To be arranged) Lab. Hrs.; 1-3 Credit Hrs.

10-128, 10-129, 10-130, 10-131, 10-132, 10-133, 10-134, 10-135 *Seminar* — Lectures on special topics and student reports on assigned projects. Eight consecutive one-term courses. 3 Class Hrs.; 2 Credit Hrs.

Chemistry

11-01 *General Chemistry* — Fundamental ideas of matter and energy, states of matter, change of state, symbols, equations, classification of elements, subatomic particles, chemistry of hydrogen, oxygen, water, alkali metals and halogens, and early ideas of atoms and molecules. 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

11-02 *General Chemistry* — Details of atomic structure and electron configurations, natural and artificial radioactivity, nuclear energy, theories of acids and bases, oxidation-reduction reactions and balancing of equations, properties and theory of electrolytic solutions, chemistry of nitrogen and sulfur families of elements. Prep. 11-01; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

11-03 *General Chemistry* — Reaction rates and chemical equilibrium, equilibrium in electrolytic solutions, elementary consideration of qualitative analysis of cations, properties of colloidal dispersions, metals and general principles of metallurgy, iron and steel manufacture, chemistry of alkaline earth metals, boron family and certain selected metals, principles of electrochemistry. Prep. 11-02; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

11-04 *General Chemistry* — Study of chemistry of carbon and group properties of silicon, tin and lead, terminology of organic chemistry, open-chain compounds and their derivatives, petroleum and its refining, closed-chain hydrocarbons and derivatives, elements of polymer chemistry including rubber substitutes and plastics. Prep. 11-03; 3 Class Hrs.; 3 Lab. Hrs.; 2 Credit Hrs.

11-09 *Inorganic Chemistry* — The elements, together with the more important classes of compounds, are surveyed from the standpoint of the periodic system. Prep. 11-04; 2 Class Hrs.; 3 Lab. Hrs.; 3 Credit Hrs.

11-10 *Quantitative Analysis* — Theory and practice of volumetric analysis. Use of the analytical balance, calibration of glassware, acidimetry and alkalinity, neutralization and precipitation methods, and the use of indicators. Laboratory work is devoted to analysis of unknowns. Prep. 11-04; 2 Class Hrs.; 3 Lab. Hrs.; 3 Credit Hrs.

11-11 *Qualitative Analysis* — Balancing of oxidation-reduction equations, outline of qualitative procedures, ionic theory and ionization constants, meaning of pH, solubility product, hydrolysis and its applications, complex compounds and co-ordination theory, amphoteric behaviors, electrode potential. Laboratory work is devoted to analysis of cations and anions by the semimicro method. Prep. 11-04; 2 Class Hrs.; 3 Lab. Hrs.; 3 Credit Hrs.

11-12 *Quantitative Analysis* — Theory and practice of volumetric analysis continued. Oxidation-reduction methods, potentiometric methods of analysis and colorimetry. Laboratory work is devoted to analysis of unknowns. Prep. 11-10; 2 Class Hrs.; 3 Lab. Hrs.; 3 Credit Hrs.

11-14 *Quantitative Analysis* — Theory and practice of gravimetric analysis. Discussion of rock analysis, iron and steel analysis, nonferrous alloys and electrolytic methods, spectrographic methods, oil analysis, determination of chlorine, sulfur, iron, and phosphorus. Laboratory work is devoted to analysis of unknowns by methods discussed in class. Prep. 11-12; 3 Class Hrs.; 6 Lab. Hrs.; 5 Credit Hrs.

11-15 *Instrumental Analysis* — A course in the use of instrumental and physico-chemical methods in analytical chemistry, including the types of instruments available, the theory of their operation, the limitations, advantages and disadvantages of each instrument. Among those considered are colorimeters, both visual and photoelectric, turbidimeters, nephelometers, spectrophotometers both visual and ultra-violet, the polarizing microscope, refractometer, polarimeter, polarograph, conductivity bridge, potentiometer, and gas analysis apparatus. Laboratory experiments with various instruments. Prep. 11-14; 2 Class Hrs.; 6 Lab. Hrs.; 4 Credit Hrs.

11-17 *Quantitative Analysis* — A course in the theory and practice of volumetric and colorimetric analysis, including the use of the various measuring instruments, the preparation, standardization and applications of neutralizing, redox, and precipitating solutions, the colorimetric determination of pH and of various materials. Laboratory work is devoted to unknown analysis by various procedures discussed in class. Prep. 11-04; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

11-18 *Quantitative Analysis* — A course in the theory and practice of elementary gravimetric methods, and selected topics in instrumental analysis. In this course, as well as in the preceding one, wherever possible the applications chosen are from the biological field. Laboratory work is devoted to analysis of unknowns by methods discussed in class. Prep. 11-17; 2 Class Hrs.; 3 Lab. Hrs.; 3 Credit Hrs.

11-20 *Organic Chemistry* — Reactions and properties of aliphatic compounds. Discussion of molecules, structural and electronic formulas, preparation and properties of halides, alcohols, aldehydes, ketones, acids, esters, ethers, amines, amides, sulphur compounds. Laboratory work is preparation of certain compounds to illustrate reactions and properties. Prep. 11-14; 3 Class Hrs.; 6 Lab. Hrs.; 5 Credit Hrs.

11-21 *Organic Chemistry* — Reactions and properties of aromatic compounds. Study of halides, nitro-compounds, amines, diazo compounds, sulfonic acids, phenols, ether, alcohols, aldehydes, ketones, acids, esters, condensed aromatic compounds, heterocyclic compounds, carbohydrates. Laboratory preparations of certain selected compounds. Prep. 11-20; 3 Class Hrs.; 6 Lab. Hrs.; 5 Credit Hrs.

11-22 *Organic Chemistry* — Industrial applications of organic chemistry. Survey of industrial solvents — hydrocarbons, halides, alcohols, nitroparaffins, cellosolves, carbitols and others. Study of unit processes, sulfonation, halogenation,

nitration, oxidation and reduction, amination, diazotization, hydrolysis. Poly-merization theory and practical applications. Industrial dyestuffs. Prep. 11-21; 3 Class Hrs.; 3 Credit Hrs.

11-23 *Qualitative Organic Analysis Laboratory* — Chemical and physical tests used in organic analysis, classification, reactions, preparations of derivatives, analysis of liquid, liquid mixtures, solids, and solid mixtures. Prep. 11-21; 9 Lab. Hrs.; 3 Credit Hrs.

11-24 *Advanced Organic Chemistry* — Electronic interpretations of organic chem-ical reactions. Alicyclic compounds and the strain theory, free radicals and odd electron molecules, electronic interpretations of organic catalytic reactions such as Perkins, Cannizzaro, Knoevenagel, Fries, Diels-Alder, acetoacetic acid ester. Reformatsky and Arndt-Eistert reactions. Laboratory work is devoted to study of assigned reactions and preparations. Prep. 11-22; 3 Class Hrs.; 3 Credit Hrs.

11-25 *Qualitative Organic Analysis Laboratory* — Chemical and physical tests used in organic analysis, classification, reactions, preparations of derivatives, analysis of liquid, liquid mixtures, solids and solid mixtures. Prep. 11-21; 6 Lab. Hrs.; 2 Credit Hrs.

11-26 *Organic Chemistry* — The hydrocarbons, alcohols, and phenols. Molecular structure, nomenclature, properties, and reactions of aliphatic, alicyclic, and aromatic hydrocarbons. Synthesis and reactions of alcohols and phenols. Laboratory work is isolation of natural products and preparation of selected compounds. Prep. 11-04; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

11-27 *Organic Chemistry* — Monofunctional compounds. Synthesis, properties, and reactions of halides, ethers, aldehydes, ketones, acids, esters, fats, amines, amides, nitriles, and azo compounds, with some attention to biological signifi-cance. Laboratory work is preparation of selected compounds. Prep. 11-26; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

11-28 *Organic Chemistry* — Polyfunctional compounds. Substituted acids, quinones, dyes, stereoisomerism, amino acids, carbohydrates, and proteins, with special emphasis on biological significance. Laboratory work is preparation of selected compounds, many of which have physiological or pharmacological importance. Prep. 11-27; 3 Class Hrs.; 6 Lab. Hrs.; 5 Credit Hrs.

11-29 *Advanced Organic Preparations* — Assigned preparations which require literature review to determine the best procedure. Prep. 11-22; 6 Lab. Hrs.; 2 Credit Hrs.

11-30 *Physical Chemistry* — Properties of ideal and real gases, kinetic theory of gases, ideal gas law, equations for real gases. Properties of liquids, equations of state, liquefaction of gases. Crystal structure, X-ray analysis, specific heat of solids, solid-liquid and solid-gas equilibria. Colligative properties of dilute solu-tions. Preparation and properties of colloidal systems. Laboratory experiments to illustrate lecture topics. Prep. 11-14 and 14-06; 4 Class Hrs.; 3 Lab. Hrs.; 5 Credit Hrs.

11-31 *Physical Chemistry* — First and second laws of thermodynamics, heat capacity of gases, thermochemistry, free energy changes, homogeneous chemical

equilibrium, calculations of equilibrium constant, heterogeneous equilibrium, phase rule, condensed system diagrams. Laboratory experiments to illustrate lecture topics. Prep. 11-30; 4 Class Hrs.; 4 Lab. Hrs.; 5 Credit Hrs.

11-32 *Physical Chemistry* — Chemical kinetics, order of reactions, types of reactions, electrical conductance of solutions of electrolytes, degree of ionization, degree of hydrolysis, types of conductance equations, electrolytic solution theory, ionic equilibria, electromotive force, standard potentials, cells, calculation of voltage. Laboratory experiments on reaction velocity, conductance measurements and electromotive force measurements. Prep. 11-31; 4 Class Hrs.; 4 Lab. Hrs.; 5 Credit Hrs.

11-33 *Physical Chemistry* — The subject matter of this course is identical with that of 11-31 Physical Chemistry except that less laboratory work is provided. Prep. 11-30; 4 Class Hrs.; 2 Lab. Hrs.; 4 Credit Hrs.

11-34 *Physical Chemistry* — The subject matter of this course is identical with that of 11-32 Physical Chemistry except that less laboratory work is provided. Prep. 11-33; 4 Class Hrs.; 2 Lab. Hrs.; 4 Credit Hrs.

11-35 *Advanced Physical Chemistry* — Nucleonics, scattering of alpha particles, nuclear composition, isotopes, separation of isotopes, mass defects, natural radioactive elements, accelerators, nuclear reactions, nuclear decay, fission. Photochemistry, theory of radiation, light sources, laws of light absorption, study of typical photochemical reactions. Elementary study of phosphorus. Laboratory experiments with Geiger tubes and study of a photochemical reaction. Prep. 11-09; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

11-36 *Special Topics* — Discussion of advanced topics in inorganic chemistry, thermodynamics or physical chemistry. Subject matter varies from year to year. Prep. 11-35; 3 Class Hrs.; 3 Credit Hrs.

11-41 *Chemical Literature* — Uses of abstracting journals, types and sources of publications, patents as sources of information, sources of financial, statistical and industrial information. Preparation of a detailed bibliography on an original topic. Prep. 11-04; 1 Class Hr.; 1 Credit Hr.

11-43, 11-44 *Senior Research* — Experimental work under direction of staff members. Approval of department head necessary. Each course carries 3 credits and extends throughout a single term. Prep. 11-32; 9 Lab. Hrs.; 3 Credit Hrs.

11-45 *Biological Chemistry* — Properties of and tests for carbohydrates, proteins, amines, nucleic acids, purines, pyrimidines, lipoids, fats. Chemistry of digestion, metabolism and detoxification. Laboratory tests for carbohydrates, proteins, amino acids and fats; enzyme reactions. Prep. 11-22 or 11-28; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

11-46 *Biological Chemistry* — Clinical analysis for blood content of non-protein nitrogen, urea, creatine, glucose, calcium, phosphate and cholesterol. Chemistry of respiration, urine in relation to pathological conditions, vitamins, hormones. Clinical tests on blood, urine and metabolism. Prep. 11-45; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

Graduate Courses

11-100, 11-101, 11-102, 11-103 *Advanced Physical Chemistry* — Study of advanced topics in physical chemistry. 3 Class Hrs.; 3 Credit Hrs.

11-104, 11-105, 11-106, 11-107 *Advanced Organic Chemistry* — Study of advanced topics in organic chemistry. 3 Class Hrs.; 3 Credit Hrs.

11-108, 11-109, 11-110, 11-111, 11-112, 11-113, 11-114, 11-115 *Thesis* — Experimental problem. Carried continuously throughout eight consecutive terms. (To be arranged) Lab. Hrs.; 1 Credit Hr.

11-116, 11-117, 11-120, 11-121 *Advanced Inorganic Chemistry* — Study of advanced topics in inorganic chemistry. 2 Class Hrs.; 2 Credit Hrs.

11-118, 11-122 *Advanced Organic Chemistry* — Study of advanced topics in organic chemistry. 2 Class Hrs.; 2 Credit Hrs.

11-119, 11-123 *Advanced Physical Chemistry* — Study of advanced topics in physical chemistry. 2 Class Hrs.; 2 Credit Hrs.

Drawing

12-01 *Engineering Drawing* — A course in fundamentals of the graphic language as applied in engineering. It comprises a thorough study of multi-planar orthographic shape description as a foundation for the later study of working drawings. The work is laid out to include the following divisions: care and use of drawing equipment, freehand lettering, geometric constructions, elements of nomography, vector diagrams, multiview orthographic drawing including primary and secondary auxiliary views and freehand technical sketching. 6 Lab. Hrs.; 3 Credit Hrs.

12-02 *Engineering Drawing* — This is a continuation of Course 12-01 and includes a study of pictorial drawing, working drawings, and applications of A.S.A. standards. Isometric, oblique, and parallel and angular perspective are studied in the pictorial field. Sections, dimensioning, screw threads, fasteners, and ink tracing are applied to simple detail and assembly drawings. Pencil work on vellum is made suitable for the various reproduction processes. Prep. 12-01; 6 Lab. Hrs.; 3 Credit Hrs.

12-03 *Descriptive Geometry* — This is a course in the theory of projection drawing. It is designed to develop powers of visualization and to solve, by revolution, auxiliary and direct method problems involving space relationships. In addition to problems with point, line, and plane, the course includes a study of intersection and development of surfaces, shadows, mining problems, graphic solutions of stresses in framed structures, and other problems of a practical nature. Prep. 12-01; 6 Lab. Hrs.; 3 Credit Hrs.

12-04 *Machine Drawing* — Detail working drawings of machine parts and assembly drawings of simple machines are made according to recommendations

of the American Standards Association. Elements of fundamental design and such simple phases of mechanism as are essential to a complete understanding of machine drawing are included in the course. Fasteners, machine parts and samples of small machines are made available for reference. Drawings are reproduced by students in blueprint, ozalid, blackline and photograph. Prep. 12-01, 12-02; 9 Lab. Hrs.; 2 Credit Hrs.

Geology

13-01 *General Geology* — A general study of the topics considered in physical geology with emphasis upon the collection and analysis of rocks and minerals. Students are required to make specific trips to places of geological interest near Boston. 3 Class Hrs.; 3 Credit Hrs.

Mathematics

14-01 *College Algebra* — The study of algebra begins with a thorough review of elementary algebra, analyzing the reasons underlying the processes already learned. The course then covers the usual topics of the first year college algebra course. The student is required at all times to know and be able to explain the reasoning in his work, thus taking the emphasis away from the memorizing of rules, and stressing the logical processes of algebra. Prep. 2 units High School Algebra; 5 Class Hrs.; 4 Credit Hrs.

14-02 *Trigonometry* — A complete course in plane trigonometry preparing the student to use the subject in the solution of triangles as well as in the more advanced courses where trigonometry is needed. Topics include radians; goniometry; logarithms; solution of triangles; transformation and solution of trigonometric and logarithmic equations; the complex number in various forms; DeMoivre's Theorem. Practice in applied problems is stressed throughout the course. Prep. 14-01; 5 Class Hrs.; 4 Credit Hrs.

14-03 *Analytic Geometry* — This being a basic course in preparation for any further study of mathematics, it requires a thorough knowledge of the fundamentals of algebra. The course covers Cartesian and polar coordinates; equations of simpler curves derived from their geometric properties; straight lines, circles, conic sections; intersections; transformation of axes; plotting; solution of algebraic equations of higher degree and of exponential and logarithmic equations; loci problems; complete analysis of second degree equations. Prep. 14-02; 5 Class Hrs.; 5 Credit Hrs.

14-04 *Introduction to Calculus* — The differentiation of algebraic functions and applications. The introduction of the differential at the same time as the derivative helps to bridge the gap which occurs when the student passes from the study of analytic geometry to the infinitesimal of calculus. Topics include continuity and discontinuity; some theory of limits; rates of change; the slope and its applications; successive and implicit differentiation; tangents, normals, angles, maxima and minima; products and fractions. Geometric interpretations and applications are stressed wherever possible. Prep. 14-03; 5 Class Hrs.; $2\frac{1}{2}$ Credit Hrs.

14-05 *Differential Calculus* — This course continues from 14-04. Topics include differentiation of algebraic, trigonometric, exponential, and logarithmic functions; successive, implicit, explicit, partial, total differentiation; curvature; points of inflection; related rates; velocity, acceleration; maxima and minima; indeterminate forms; infinite series; applications in geometry, physics, and mechanics. Prep. 14-04; 4 Class Hrs.; 4 Credit Hrs.

14-06 *Integral Calculus* — The course deals with integration as the inverse of differentiation as well as the limit of summation. Topics include methods of integration; successive, indefinite, definite integrals; constant of integration; rectangular and polar coordinates; areas, center of gravity; moment of inertia; length of curves; volumes; areas of surfaces of revolution; applied problems in work, pressure, etc.; solution of simpler differential equations. Prep. 11-05; 4 Class Hrs.; 4 Credit Hrs.

14-07 *Differential Equations I* — The elementary theory and solution of ordinary differential equations is offered as a general course in mathematics. Although principally a problem course, properties of equations and of their solutions are deduced and applications in some fields of science are analyzed. Prep. 14-06; 4 Class Hrs.; 3 Credit Hrs.

14-08 *Differential Equations II* — Topics include special cases of first order equations; first order higher degree with envelopes; special loci; particular curves; applications in mechanics; general second order linear equation with some special methods; solution in series; Legendre and Bessel equations; elementary partial differential equations of the first and second orders; Fourier series. Prep. 14-07; 4 Class Hrs.; 4 Credit Hrs.

14-09 *Analytic Mechanics I* — Topics include vector analysis; Newton's laws of motion; statics; kinematics, and dynamics of particles and rigid bodies in a plane; moments; friction; energy and work; impulsive motion; vibrations. Prep. 14-06; 4 Class Hrs.; 4 Credit Hrs.

14-10 *Analytic Mechanics II* — This course is a continuation of 14-09. Topics include statics, kinematics, and dynamics of particles and rigid bodies in space; moments; energy and work; impulsive motion; Lagrange's equations; introduction to the special theory of relativity; Lorentz transformation. Prep. 14-09; 4 Class Hrs.; 4 Credit Hrs.

14-12 *Systems of Geometry* — Topics include spherical geometry and trigonometry with a complete solution of the spherical triangle; geometry of Euclid with points and lines at infinity, geometry of the triangle and circle, harmonic division and cross-ratios, inversion, poles and polars; non-Euclidean geometries, the parallel postulate, geometries of Bolyai, Lobachevsky, and Riemann. Prep. 14-06; 4 Class Hrs.; 4 Credit Hrs.

14-14 *History of Mathematics* — A survey of the development of the various branches of mathematics, with special attention to the lives of men who have made outstanding contributions to mathematical science; relations between the growth of mathematical knowledge and the development of civilization. Prep. 14-06; 4 Class Hrs.; 4 Credit Hrs.

14-15 *Advanced Calculus I* — This and the following course are essential to advanced study in both pure and applied mathematics. Some of the topics are special methods of integration, improper definite integrals; hyperbolic functions; theorems on limits, continuity, differentials, mean-value, indeterminate forms; Taylor's series. Prep. 14-06; 4 Class Hrs.; 4 Credit Hrs.

14-16 *Advanced Calculus II* — A continuation of 14-15. Among the topics are applications of partial differentiation; composite and implicit functions; Jacobians; the Riemann definite integral; differentiation of integrals; special definite integrals, the Gamma and Beta functions; Fourier series; Bessel's functions; elliptic functions. Prep. 14-15; 4 Class Hrs.; 4 Credit Hrs.

14-17 *Infinite Series* — Study of limits; infinite series; tests of convergence and divergence; algebraic operations with series; integration and differentiation of series; integration by means of series; applications and uses of special series, including power and Fourier series. Some applications in the solution of differential equations. Prep. 14-06; 4 Class Hrs.; 4 Credit Hrs.

14-18 *Theory of Equations* — A first course in theory and analysis of equations; properties of polynomials, continuity; complex numbers in algebraic, geometric, trigonometric, and exponential form; solution of equations of higher degree; discriminants; various theorems on roots. A proof of the fundamental theorem of algebra is covered. The relations between roots and coefficients and some symmetric functions are included. Theory and use of determinants; complete analysis of n equations in m unknowns. Prep. 14-06; 4 Class Hrs.; 4 Credit Hrs.

14-19 *Solid Analytic Geometry* — A study of space geometry, covering rectangular, polar, cylindrical, and spherical coordinates. Planes, lines, surfaces, and curves in three dimensions are analyzed. Calculus is used with total and partial differentiations. Prep. 14-06; 4 Class Hrs.; 4 Credit Hrs.

14-20 *Special Topics in Mathematics* — Here the student practices the application of his mathematics to special applied problems in the various fields of science. The course may require considerable reference work in special topics chosen so as to be of particular interest to the individual student. (For seniors only) 4 Class Hrs.; 4 Credit Hrs.

14-21 *Basic Mathematics* — A course in algebra, partly review, for non-science students, in preparation for work in trigonometry and physics. High school algebra is reviewed, using the basic methods of logical reasoning rather than the use of formulae and rules, before the more advanced topics are taken. 3 Class Hrs.; 3 Credit Hrs.

14-22 *Basic Mathematics* — A course for non-science students in plane trigonometry, including logarithms. The usual topics of plane trigonometry through the solution of triangles are covered. Prep. 14-21; 3 Class Hrs.; 3 Credit Hrs.

14-23 *Basic Mathematics* — A continuation of the two preceding courses, with more special topics in algebra and trigonometry, as needed for the study of physics and analytic geometry. Analytic geometry is introduced with emphasis on plotting of graphs and the analysis of some of the equations used in the preceding courses. Prep. 14-22; 3 Class Hrs.; 3 Credit Hrs.

14-24 *Introduction to Mathematics* — An elementary mathematics course for students not taking any other mathematics. Topics included: number systems; basic principles underlying algebra and geometry; translation of stated problems into mathematical symbols and interpretation of mathematical symbols into correct English sentences; uses and evaluation of formulas; solution of first degree and simultaneous equations; story problems; fractions; graphs; variation; binomial theorem; progressions. 3 Class Hrs.; 2½ Credit Hrs.

14-25a; 14-25b *Mathematics of Finance* — A two-semester course for students of finance, starting with the elements of algebra and logarithms, necessary for the understanding and use of the formulas of business mathematics. Other topics include interest, discount, annuities, sinking fund, depreciation, amortization, evaluation of bonds, the use of graphs, interpolation, interpretation of statistical data, insurance. 3 Class Hrs.; 3 (each) Credit Hrs.

14-28 *Mathematical Statistics I* — The course covers the elements of probability theory for continuous and discrete distributions. Large sample theory of one and two variables is developed, including regression and correlation with particular attention to applications. Some time is spent on representation of statistical data. Prep. 14-06; 4 Class Hrs.; 4 Credit Hrs.

14-29 *Mathematical Statistics II* — This is a continuation of Course 14-28. The topics covered are distributions of more than two variables, multiple and partial correlation, small sampling theory, "student's" distribution, the chi-square distribution, non-parametric methods, statistical hypotheses, and statistical design in experiments. Prep. 14-28; 4 Class Hrs.; 4 Credit Hrs.

Physics

15-01 *Physics* — A study of the basic principles of mechanics. The topics treated include units, vectors, linear and angular motion, torque, force, mass, Newton's laws of motion, friction, central forces, moment of inertia, and static equilibrium. Lectures and demonstrations only. 3 Class Hrs.; 3 Credit Hrs.

15-02 *Physics* — This course completes the study of mechanics and starts the subject of electricity. Energy, power, machines, vibratory motion, elasticity, fluids, and electrostatics are studied. Lectures and demonstrations only. Prep. 15-01; 3 Class Hrs.; 3 Credit Hrs.

15-03 *Physics* — In this course magnetism and electricity are studied. The topics discussed are magnetism, direct current, resistivity, direct current circuits, electromagnetism, magnetic circuits and condensers. Lectures and demonstrations only. Prep. 15-02; 3 Class Hrs.; 3 Credit Hrs.

15-04 *Physics* — The basic principles of alternating current generation and series circuits, thermoelectric, photoelectric, and thermionic effects, the diode, the triode and the cathode ray oscilloscope are the topics studied. Lectures and demonstrations only. Prep. 15-03; 3 Class Hrs.; 1½ Credit Hrs.

15-05 *Physics* — A first course in the study of light, the basic principles of wave motion, reflection and refraction of light, mirrors, prisms, lenses, types of spectra

and the spectroscope, color, optical instruments, interference effects, the diffraction grating, polarization, and light sources are the topics discussed. Lectures, demonstrations, and laboratory experiments on selected topics in mechanics and light. Prep. 15-04; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

15-06 *Physics* — A first course in sound and heat. The subjects covered in sound are types of wave motion, characteristics of sound, vibrations in strings, rods and air columns, resonance, musical scales and intensity levels. In heat, the topics covered are temperature scales, calorimetry, change of state, expansion of solids, liquids and gases, the general gas laws, humidity, mechanical equivalent and transfer of heat. Lectures, demonstrations, and laboratory experiments on selected topics in sound, heat, and electricity. Prep. 15-04; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

15-07 *Survey of Physical Sciences* — This sequence of courses is designed to give students an understanding of the physical sciences. In this term astronomy, light, and sound are discussed. The classwork will be supplemented by observations, demonstrations, and motion pictures. 3 Class Hrs.; 3 Credit Hrs.

15-08 *Survey of Physical Sciences* — A continuation of 15-07 with consideration of physical geology together with a study of rocks and minerals, their analysis and use. Discussion of the principles of heat, its use and its measurements. Demonstrations. 3 Class Hrs.; 3 Credit Hrs.

15-09 *Survey of Physical Sciences* — The work of 15-07 and 15-08 has prepared the student for the more difficult study of mechanics and electricity. The simple mathematics used is thoroughly discussed and homework is assigned. 3 Class Hrs.; 3 Credit Hrs.

15-10 *Survey of Physical Sciences* — This short term is devoted to a study of chemistry. A broad view of the subject is taken. Yet there is ample time for a thorough investigation of the more interesting topics. 4 Class Hrs.; 2 Credit Hrs.

15-11 *General Physics* — The general topic of consideration is a survey of Newtonian mechanics. Specific topics include methods of measurement, laws of rectilinear motion, uniform circular motion, equations of equilibrium, and mechanics of liquids. Lectures and demonstrations are coupled with problems solvable by algebraic or trigonometric methods only. Prep. 14-23; 6 Class Hrs.; 3 Credit Hrs.

15-12 *General Physics* — A survey of the topics of heat, wave motion, sound and light with some discussion of the laws of X radiation and radioactivity. Lectures, demonstrations, problems and laboratory experiments are performed by the students on the above topics and those of 15-11. Prep. 15-11; 3 Class Hrs.; 3 Lab. Hrs.; 5 Credit Hrs.

15-13 *General Physics* — A study of the topics of electricity and magnetism and introductory electronics. Ohm's Law, induced E.M.F.'s, alternating current, telegraphy and simple vacuum tubes are among topics discussed. Lectures, demonstrations, problems and laboratory work on the above topics. Prep. 15-12; 3 Class Hrs.; 3 Lab. Hrs.; 5 Credit Hrs.

15-14 *Advanced Physics* — A study of gaseous conduction and its applications, electron emission and basic electron tubes, including the fundamental circuits of electron tubes. This course is for Chemistry Majors only and the use of chemistry in the manufacture of electron tubes is stressed. The course time is equally divided between class and laboratory periods. Prep. 14-06, 15-06; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

15-15 *Advanced Physics* — A brief study of experimental spectroscopy. The topics discussed are the general optical principles of spectroscopic apparatus, prism spectroscopes and spectrographs, the photographic process, slit width and illumination, the diffraction grating, types of mounting for the grating, the Bohr-Sommerfeld atom, the origin of atomic spectra, the spectra of the hydrogen and sodium atoms and quantum numbers. Lectures and laboratory experiments. For Chemistry Majors only. Prep. 14-06, 15-06; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

15-16 *Electricity and Magnetism* — Selected topics not covered in 15-03 and 15-04 are studied, including work in electrostatics, magnetism, direct and alternating currents, electrical units, and Maxwell's equations. This course serves as an intermediate between Courses 15-04 and 15-24. Prep. 15-06, 14-06; 3 Class Hrs.; 3 Credit Hrs.

15-20 *Optics* — After a brief consideration of wave motion, a detailed study is made of interference and Fraunhofer diffraction of light. A thorough understanding of the fundamental principles of physical optics, which the student is encouraged to use in attacking theoretical and experimental problems, is the objective of the classroom discussions. All topics are illustrated by laboratory experiments, designed to acquaint the student with optical techniques and the handling of instruments of high precision. Prep. 14-06, 15-06; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

15-21 *Optics* — A continuation of 15-20, with the same general objectives. Diffraction gratings, Fresnel diffraction, and polarization are studied in detail. The latter part of the course is devoted to a consideration of a special topic, for example, spectra, dispersion, Maxwell's equations, which is chosen by the class. All topics are illustrated by laboratory experiments, with increased emphasis on handling instruments of high precision. Prep. 15-20; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

15-22 *Acoustics* — This course includes a detailed mathematical study of the modes of vibration of strings, pipes, and membranes, with a consideration of vibrating systems in general. A thorough understanding of fundamental principles, which the student is encouraged to use in attacking theoretical and experimental problems, is the objective of the classroom discussions. All topics are illustrated by laboratory experiments, with comparatively simple apparatus, designed to acquaint the student with acoustical techniques. Prep. 14-06, 15-06; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

15-23 *Acoustics* — A continuation of 15-22, with the same general objectives, this course applies the principles previously studied to the problems of speech, audition, filters, loud speakers, musical instruments, and the acoustics of auditoriums. All topics are illustrated by laboratory experiments, with more

complicated apparatus than that used in the preceding course. Prep. 15-22; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

15-24 *Electronics* — This course is designed to make the student familiar with the principles, operation, and application of electronic devices. Electron emission, diodes, triodes, tetrodes, pentodes, followed by voltage amplifiers at radio and audio frequencies. Rectifier and filter circuits complete the course. Experiments are performed on all of these topics. Prep. 15-16; 3 Class Hrs.; 2 Lab. Hrs.; 4 Credit Hrs.

15-25 *Electronics* — Continuing the work of the first term with power amplifiers, oscillators, photo tubes, thyratrons. The power amplifier topic includes negative feedback, push pull and radio frequency types. Oscillators are studied at both radio and audio frequencies and of several types. Comprehensive experiments are done on all topics. Prep. 15-24; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

15-26 *Modern Physics* — A study of molecular relationships, atomic nature of matter and electricity, the corpuscular nature of radiant energy, quantum mechanics, wave theory of matter, atomic structure, spectroscopy and X-ray production and measurement. Prep. 14-06, 15-06; 4 Class Hrs.; 4 Credit Hrs.

15-27 *Modern Physics* — Atomic spectra, molecular spectra, periodic system, radioactivity, alpha-beta-gamma ray spectra, nuclear structure and devices for studying these phenomena are presented. Some time is also given to artificial transmutation processes, fission and cosmic rays. Prep. 15-26; 4 Class Hrs.; 4 Credit Hrs.

15-28 *Electrical Instruments* — This is a laboratory course to acquaint the student with the numerous electrical and electronic instruments that are used in research. Their correct use and limitations are carefully studied. Use is made of common d-c and a-c instruments, vacuum tube voltmeters of various types, audio oscillators, radio-frequency generators, cathode ray oscilloscopes, audio and radio-frequency bridges, and impedance bridges. The latter part of the course covers the use of several of the instruments in each problem. Prep. 15-25; 2 Class Hrs.; 4 Lab. Hrs.; 4 Credit Hrs.

15-29 *Radio Communications* — This course is designed to provide a thorough knowledge of the radio communication system from the microphone to the loud-speaker, by tying together the various components of the system as studied in previous courses. Modulators, radio-frequency amplifiers, and antennas will be studied from the transmitter end of the system. Then the propagation problems at the various frequencies, the superheterodyne receiver, the basic communication laws that govern intelligence vs. band width, and the sources of interference to radio systems will be covered. Prep. 15-25; 3 Class Hrs.; 2 Lab. Hrs.; 4 Credit Hrs.

15-31 *Nuclear Physics* — A chronological outline of the development of theories of the nucleus. Alpha, beta and gamma ray spectra and their interaction with matter. Introduction of the neutrino, pair formation and mesons. Scattering and cross sections. Prep. 14-07, 15-27; 3 Class Hrs.; 3 Credit Hrs.

15-32 *Nuclear Physics* — Introduction to those parts of quantum theory and relativity having a bearing on the study of the nucleus. Nuclear structure, statistics and forces. Majorana, Heisenberg forces and, if time permits, more modern theories. Prep. 15-31; 3 Class Hrs.; 3 Credit Hrs.

Physical Education

16-10, 11, 12 *Physical Training* — All first-year men students are required to take Physical Training or R.O.T.C. Health, strength and vitality do not come by chance but by constant attention to those factors involved in their development. It is very essential for the student to acquire good habits of living.

The work in the course includes a minimum of formal calisthenics, special exercise classes for the correction of postural defects, participation in athletic games and sports, including baseball, basketball, football, hockey, track and many types of informal games.

Students wishing to be excused from Physical Training because of physical defects are required to present a petition to the faculty supported by a physician's certificate. 2 Lab. Hrs.; 0 Credit Hrs.

16-21 *Principles of Physical Education* — The course considers the place of physical education in the educational program in the United States. The development of physical education programs based on the changes in society from primitive to modern times is discussed, careful attention being given to the needs of the individual, as well as to the needs of the group. Relationship between medical service and the physical education department is considered, and methods of coordination between these two important departments are investigated. Factors such as economic, social and political influences which have an important effect on the conduct of the program are also considered. School health programs are discussed, with particular emphasis upon the medical and physical examinations and the procedures which follow. Diagnostic and remedial techniques, classroom hygiene and principles of preventive and corrective exercise are discussed. The course also includes a consideration of the proper place occupied by interschool and intercollegiate athletics in the physical education program.

Required of all students electing Physical Education as a minor field. 4 Class Hrs.; 4 Credit Hrs.

16-23 *History of Physical Education* — To provide a valuable background for students in this field, this course traces the whole history of physical education from the days of the Greeks and Romans up to the present. Attention is given to special systems of training which have been developed in the United States as well as in foreign countries.

The course is required of all students electing Physical Education as a minor field. 4 Class Hrs.; 4 Credit Hrs.

16-24 *Administration of Physical Education* — This course is designed to acquaint students in the field of physical education with many of the administrative problems which are likely to arise in connection with their work. The subject matter includes a consideration of the objectives of the physical education program, personnel required, and various allied subjects, such as gymnasia, athletic fields and the construction and maintenance of these units. The conduct of the athletic program, including requirements for equipment, arrangements of schedules, coaching, meets, etc., is also included.

Required of all students electing Physical Education as a minor field. 4 Class Hrs.; 4 Credit Hrs.

16-25 *Football* — This course is designed to furnish the student interested in football coaching with a thorough knowledge of the sport. Careful consideration is given to the fundamentals in discussing the plays of each position in the line and backfield. Various well-known offensive and defensive systems are discussed for the purpose of considering their general merits, as well as adaptations to particular situations. Training and conditioning, rules and interpretation, and officiating are given proper attention. 4 Class Hrs.; 4 Credit Hrs.

16-26 *Track and Field Events* — This course considers the care and training of track athletes. Practice schedules, selection of material, conduct of meets, etc., are discussed. The viewpoint from which the topics are treated is that of the student of coaching technique. In connection with this course, action pictures taken from actual performances by world champions, together with moving pictures, are of great value in demonstrating the style and technique of track and field events. 4 Class Hrs.; 4 Credit Hrs.

16-27 *Basketball and Baseball* — The baseball section of the course covers with reasonable completeness the job of the coach in either high school or college to properly administer the sport. The techniques of individual and team play in fundamentals and strategy are covered to make for a well-rounded program.

The basketball section of the course deals with organization and conducting basketball as a phase of interschool competition. Basic fundamentals and techniques as well as the different systems of individual and team play as employed in the major schools of the country are stressed. 4 Class Hrs.; 4 Credit Hrs.

Economics

20-01 *Economic Geography* — After a presentation of the broad field of study in economic geography, this course concentrates upon the fundamental geographic and geologic facts and principles that are necessary to an understanding of basic economic institutions. 3 Class Hrs.; 3 Credit Hrs.

20-02 *Economic Geography* — This course continues the study in economic geography by examining the available and potential resources and institutions of the different countries and areas of the world. Prep. 20-01; 3 Class Hrs.; 3 Credit Hrs.

20-03 *Economic Geography* — This course concludes the basic work in economic geography by analyzing intra- and international economic relationships and exploring future possibilities. Prep. 20-02; 3 Class Hrs.; 3 Credit Hrs.

20-05 *Economic Geography* — This course analyzes the geography and the economic resources of the world, particularly those of the United States. Emphasis is placed upon the part played by these factors in the development of our modern industrial society and upon world affairs. 4 Class Hrs.; 4 Credit Hrs.

20-09 *Introduction to Statistics — Graphical Presentation* — This course presents the fundamentals of the graphic language as it is employed in business and industrial relationships and is intended to facilitate a better understanding between the fabrication and marketing phases of industrial products. It includes

a study of drawing equipment and its use, lettering, geometric constructions, multiplaner orthographic projection, freehand and technical sketching, pictorial representation, and elements of dimensioning, with a study and interpretation of drawings from the various industrial fields. 3 Class Hrs.; 6 Lab. Hrs.; 3 Credit Hrs.

20-11 *Economics* — After an analysis of the main characteristics of our modern economic order, the course deals with the principles of price determination under competitive and monopolistic conditions, and the principles underlying the distribution of wealth and income into wages, rent, interest and profits. 3 Class Hrs.; 3 Credit Hrs.

20-12 *Economics* — A continuation of 20-11. Attention is given to the problems of the business cycle, fiscal policy, exchange, banking, international trade, and social movements. The student is encouraged to give serious consideration to government and private enterprise policies and problems. Prep. 20-11; 3 Class Hrs.; 3 Credit Hrs.

20-13 *Economic Principles* — A thorough grounding in the fundamental princi-ples and laws of economics is the aim of this basic course. The main topics include the nature and organization of production, the nature and importance of wants, the relation of money and prices, the process of exchange, the nature of international trade, the determination of price under conditions of competition and monopoly, the distribution of wealth and income in the form of wages, economic rent, interest, and profits. Prep. 20-03 B.A., 20-05 L.A.; 4 Class Hrs.; 4 Credit Hrs.

20-14 *Economic Problems* — In this course the application of economic principles to some of the major economic problems of modern society is emphasized. The problems studied include consumption, international economic relationships, labor problems such as wages, unemployment, social security, and collective bargaining and the business cycle. Prep. 20-13; 4 Class Hrs.; 4 Credit Hrs.

20-15 *Economic Problems* — A continuation of 20-14 Economic Problems. Among the problems considered are the following: price stabilization, the agri-cultural problem, the relation of government to business, including the control of monopolies and public utilities, public finance, and proposals for the remodeling and improving of the economic system. Prep. 20-14; 4 Class Hrs.; 4 Credit Hrs.

20-16 *Accounting Principles* — A course in accounting designed for those who must have a fundamental knowledge of accounting procedures and devices. The basic accounting cycle is presented. 3 Class Hrs.; 2 Lab. Hrs.; 4 Credit Hrs.

20-17 *Accounting Principles* — A continuation of 20-16 in which the student is presented with a more intimate knowledge of the accounting activity of the partnership and corporate types of business organization. The approach is exclusive in that the dominant features of accounting practice are presented and analyzed. Prep. 20-16; 3 Class Hrs.; 2 Lab. Hrs.; 4 Credit Hrs.

20-18 *American Economic History* — The economic development of the United States is traced from the colonial period to the present with special emphasis upon the period since the Civil War. Stress is laid upon the importance of

economic factors and changes in our history in the description of the development of manufacturing, agriculture, domestic and foreign commerce, finance and banking, transportation and labor organizations. Consideration is given to European developments which have been closely related to those of the United States. Prep. 20-11 or 20-13; 4 Class Hrs.; 4 Credit Hrs.

20-20 *Statistics* — This course is intended to give the student an understanding of statistical principles and methods and their practical application. A study is made of the nature, sources, collection, and organization of statistical facts; the presentation of such facts in tabular or graphic form; the various averages, measures of dispersion; and probability theory, including the bases of quality control. Laboratory periods provide an opportunity for each student to demonstrate his ability to apply the principles studied. 3 Class Hrs.; 2 Lab. Hrs.; 4 Credit Hrs.

20-21 *Statistics* — The major portion of this continuation of 20-20 involves three subjects; time series analysis, including methods of obtaining trends, seasonal indexes, and the measurement of cyclical variation; correlation analysis and the construction and use of index numbers. Prep. 20-20; 3 Class Hrs.; 2 Lab. Hrs.; 4 Credit Hrs.

20-22 *Industrial Statistics I* — The increasing use of statistics in business and in the field of industrial engineering makes essential an understanding of the fundamental methods and applications of statistical analysis. These are studied from the point of view of the user of statistical data. Statistical theory and simple mathematical analysis of statistical procedures are included as necessary to understanding the practical uses, as well as the limitations, of statistical inference in the work of the industrial engineer. The topics considered include the collection and presentation of statistical data in tabular and graphic form, the uses and construction of frequency distributions, averages, measures of dispersion and skewness; and the normal curve. 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

20-23 *Industrial Statistics II* — A continuation of 20-22, this course examines further the drawing of inferences from samples and then takes up the construction of index numbers, the analysis of time series, and simple linear correlation. Prep. 20-22; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

20-24 *Money and Banking* — This course considers the problems of getting money supply and keeping it sound. It deals with the internal problems of managing the bank's funds to make profits. The external control through Federal Reserve policy is taken up and integrated with both the bank's viewpoint and the aims of the Government in financing its budget. Prep. 20-15; 4 Class Hrs.; 4 Credit Hrs.

20-25 *Business Cycles* — This course covers the causes of unstable equilibrium and the ways it is measured, with its effect on our economy. Methods of making short-range and long-range forecasting; sources of material on business conditions and sequence and amplitude of this material are covered next. Finally the forecasting services are analyzed and current business conditions studied. Prep. 20-15; 4 Class Hrs.; 4 Credit Hrs.

20-26 *Labor Economics* — This course begins with a preliminary study of the growth of the working class and a brief analysis of the labor problem. It then considers the organization and functioning of labor unions and management under collective bargaining with emphasis upon its scope rather than upon particular issues. Prep. 20-14; 4 Class Hrs.; 4 Credit Hrs.

20-27 *International Economic Relations* — A systematic survey of the development of international commercial policies in recent times. Changes in the structure of the world economy are examined, especially those that have occurred since World War I. The basic principles needed to understand modern commercial policy are developed, and the policies of individual nations and international organizations are analyzed in the light of these principles. Prep. 20-14; 4 Class Hrs.; 4 Credit Hrs.

20-28 *Economic Systems* — After developing criteria for evaluating the different economic systems, the course proceeds to a comparative analysis of capitalism, co-operation, socialism, communism, and fascism. The problems of economic planning receive particular attention. Prep. 20-15; 4 Class Hrs.; 4 Credit Hrs.

20-31 *Advanced Economic Theory* — A critical review of the origin and development of economic thought. After a brief account of the contributions of Plato and Aristotle, the early Christian fathers, and the writers of the Middle Ages, each of the main schools of economic thought is taken up in turn: the Mercantilists, the Physiocrats, the Classical School, the Socialists, the Historical School, the Austrian School, and the Neo-Classical School. Prep. 20-15; 4 Class Hrs.; 4 Credit Hrs.

20-32 *Advanced Economic Theory* — This course introduces the student to the more complex aspects of economic theory. Its primary purpose is to familiarize the student with the work of contemporary economists and with the basic ideas underlying the theoretical problems now most widely considered. Prep. 20-31; 4 Class Hrs.; 4 Credit Hrs.

20-40 *Business and Government* — This course is directed toward the development of an understanding of the part played by government (local, state, national) in economic affairs, both directly and indirectly, and of the relationships between business and government. The attitude of government toward business and toward the economic institutions affecting business, as evidenced by legislative, judicial, executive and administrative actions, will be analyzed with some reference to problems of a mobilized economy. Prep. 20-15; 4 Class Hrs.; 4 Credit Hrs.

20-51 *Public Finance* — This is a treatment of fiscal policies and practices at the national, state, and local levels of our government. Prep. 20-15; 4 Class Hrs.; 4 Credit Hrs.

*20-54 *Introduction to Marketing* — A study of the selling principles and practices of our markets. 5 Class Hrs.; 2½ Credit Hrs.

*20-55 *Introduction to Advertising* — A study of the underlying principles of advertising and the tools used in applying these principles. 5 Class Hrs.; 2½ Credit Hrs.

*Five-week term course.

*20-57 *Business Management* — (Not open to students who have had 45-21 Principles of Business Management.) An introductory survey of the principles and problems of business management. 5 Class Hrs.; 2½ Credit Hrs.

*20-58 *Personal Finance* — (Preparation: 20-12 Economics or 20-13 Economic Principles). This course will deal with the planning of personal expenditures, setting up an insurance program, and building an estate. 5 Class Hrs.; 2½ Credit Hrs.

*20-59 *Federal Income Taxes* — (Preparation: one year of accounting in college. Not open to Accounting majors). This course is designed to provide a brief survey of the Federal tax structure and to provide some training in the application of tax principles to specific problems. 5 Class Hrs.; 2½ Credit Hrs.

*Five-week term course.

Education

21-01 *History of Education* — Education is considered as the means by which nations have attempted to realize their social and spiritual ideals. This course traces the history of education from ancient times through the Greek and Roman periods, the Middle Ages, the Renaissance and Reformation, down to John Locke and the Enlightenment. The course is concerned with the development of points of view as well as with details of organization and practice. 4 Class Hrs.; 4 Credit Hrs.

21-02 *History of Education* — Beginning with the emotional reaction against formalism in life as exemplified by Rousseau, this course takes up the immediate background of modern education and traces the development of national systems. The influence of such men as Pestalozzi, Herbart, Froebel, Spencer, Mann, Barnard, Dewey, and others is studied in detail. The course closes with a consideration of present tendencies in education. 4 Class Hrs.; 4 Credit Hrs.

21-03 *Educational Measurements* — This course concerns itself with current problems in the field of educational tests and measurements. Most of the lectures are given over to a discussion of the construction and use of new type objective tests, with particular reference to the field of secondary education. The relative merits of the essay and the objective examination are considered in connection with the problem of grades and grading systems. Enough elementary statistics are included to enable students to use intelligently the results of testing. Emphasis is placed upon the importance of accurate interpretation of test data and upon the futility of indiscriminate testing. 4 Class Hrs.; 4 Credit Hrs.

21-04 *Educational Organization and Administration* — A study of the principles underlying the organization, administration, and supervision of secondary schools in the U. S. A. The course is illustrated with suitable problems taken from actual practice. The emphasis will be placed on the classroom teacher's part in administration. It should be of special interest to students who contemplate teaching as a vocation. 4 Class Hrs.; 4 Credit Hrs.

21-05 *The Secondary School Curriculum* — This course is a study of the evolution of the curriculum in the secondary schools of the United States, with special emphasis on recent curricular developments. Conflicting educational theories, sociological and economic factors in curriculum development, and the effect of changes in the elementary school curriculum on the secondary school will be discussed.   4 Class Hrs.; 4 Credit Hrs.

21-06 *Educational Sociology* — The course considers the relationship between education and sociology. Educational objectives are set up from the findings of sociological research and the traditional curriculum is examined in the light of these objectives with a view towards its reconstruction.   A critical attitude is maintained toward philosophical implications which will inevitably arise in the course. 4 Class Hrs.; 4 Credit Hrs.

21-07 *Educational Philosophy* — A study of the relationship between the science of education and the philosophy of education is followed by a consideration of philosophies of education in the light of basic theses of the history of philosophy. Such topics as evolutionism, behaviorism, pragmatism, instrumentalism, and progressive education are viewed in the perspective of the history of philosophy. 4 Class Hrs.; 4 Credit Hrs.

21-08 *Principles of Secondary Education* — A critical study of the aims, objectives and functions of secondary schools.   The needs of secondary school pupils in a democracy and the ways in which these needs are met are carefully considered.   Relations of the junior high school, the senior high school, and the junior college to American life are discussed. 4 Class Hrs.; 4 Credit Hrs.

21-09 *Methods of Teaching in Secondary Schools* — A fundamental course in methods of teaching. Such topics as traditional vs. democratic types of teaching and the unit plans and procedures are discussed. Special attention is paid to the problems and techniques of planning, drill, questioning, visual and audio aids and classroom management.   The problems of job placement in the teaching profession will be included in this course. Prep. 21-05; 4 Class Hrs.; 4 Credit Hrs.

21-10 *Introduction to Professional Education* — An orientation to teaching as a profession, the role of the teacher and his relations to professional colleagues, parents, and students.   Consideration will be given to the job possibilities in Education, the kinds of preparation needed, the standards required for competence in various educational fields, and how the program at Northeastern is organized to meet these standards.   4 Class Hrs.; 4 Credit Hrs.

21-11 *Principles of American Education* — A survey will be given of the educational system of America: its historical development; its organization and administration; its free, public and non-sectarian nature; and its general purposes and meaning for American life. Prep. 21-10; 4 Class Hrs.; 4 Credit Hrs.

Human Development Sequence.

21-12 *Human Development I* — Prep. 21-11; 3 Class Hrs.; 3 Credit Hrs.
21-13 *Human Development II* — Prep. 21-12; 3 Class Hrs.; 3 Credit Hrs.
21-14 *Human Development III* — Prep. 21-13; 3 Class Hrs.; 3 Credit Hrs.
   Organized in integrated manner with emphasis placed on understanding the

way people grow and develop from birth to adulthood, the development of principles applicable to the study of people of varying ages, analysis of growth gradients in the many facets of personality patterns. An intensive study of one or more young persons will be included.

Learning and Teaching.

21-15 *Learning and Teaching* — Major emphasis will be placed on the learning process, the discovery of general principles applicable to good teaching with immediate application of those principles to planning work for individual classrooms. 6 Class Hrs.; 6 Credit Hrs.

Learning and the Curriculum.

21-16 *Learning and the Curriculum* — Major emphasis will be placed on the application of learning principles to the total school program, the building of a framework within which a full staff can operate, and the relation of individual teaching units to the total program. 6 Class Hrs.; 6 Credit Hrs.

Methods and Materials in the Teaching Major — For Secondary School Teaching.

21-20 *English*	21-25 *Social Studies*
21-21 *Foreign Languages*	21-26 *General Business*
21-22 *Science*	21-27 *Secretarial Science*
21-23 *Mathematics*	21-28 *Distributive Education*

To apply the understanding of teaching principles previously developed to the specific teaching major, to utilize the sources and materials available to meet such problems as setting up developmental programs in the subject field. 3 Class Hrs.; 3 Credit Hrs.

Specialized Areas for Elementary School Teaching.

21-30 *Elementary Language Arts* — Emphasis given to the best ways to develop a thorough and consistent program in all the communication skills through the study of research, materials and other aids currently available. 3 Class Hrs.; 3 Credit Hrs.

21-31 *Reading in Elementary Schools* — Emphasis on organization of a sound, continuous program in the basic R on various elementary levels, how to meet differences in readiness and ability, how to motivate students. Research and best materials will be given thorough study. 4 Class Hrs.; 4 Credit Hrs.

21-32 *Arithmetic* — A study of the number system, its internal relationships and meanings leading to thorough understandings. 3 Class Hrs.; 3 Credit Hrs.

21-33 *Teaching of Arithmetic* — How to organize a continuous program in the second basic R on all elementary levels so that understandings of the meanings in number relationships and their social significance can be developed. 3 Class Hrs.; 3 Credit Hrs.

21-34 *Elementary Social Studies* — Emphasis placed on the development of understanding of America, its heritage, its geography, its values, proper attitudes of citizenship, and social skills. 2 Class Hrs.; 2 Credit Hrs.

21-35 *Elementary Science* — A study of ways in which interest in and understanding of the elementary school students' natural environment can be developed. 2 Class Hrs.; 2 Credit Hrs.

21-36 *Creative Arts in Elementary Schools* — Included are the study of how Music, the Dance, Drama, and Art may contribute to an enriched program as well as the development of the creative powers of young people. 3 Class Hrs.; 3 Credit Hrs.

21-40 *Student Teaching* — The culmination period of ten weeks in the senior year in which the prospective teacher assumes responsibility for organizing learning experiences in his major area under expert supervision. 8 Credit Hrs.

21-41 *Seminar in Teaching* — To run concurrently with student teaching experience, conducted by the supervisor, to aid in the analysis and solution of student teacher problems. 2 Credit Hrs.

Government

22-01 *American Government* — The influence of the early state governments and the Articles of Confederation upon the Constitution is studied. Following an analysis of the Constitution the rest of the term is concerned with the relation of individuals to government; the Constitutional safeguards for freedom; the focusing of public opinion through parties; and party activity in gaining public office. 3 Class Hrs.; 3 Credit Hrs.

22-02 *American Government* — The structure, powers and work of Congress are followed by a similar approach for the executive and of the judiciary. Administrative problems relating to civil service, national finance, interstate commerce, and government regulation of business are also analyzed. Prep. 22-01; 3 Class Hrs.; 3 Credit Hrs.

22-03 *American Government* — The study of the National Government will be concluded. Such topics as Agriculture, Conservation, Labor, Foreign Relations and territories will be discussed.

The remainder of the term will consist of a survey of State and Local Governments under such headings as State Constitutions, State Legislatures, the Governor, State Judiciary, State Finance, Municipal Government and Administration. Prep. 22-02; 3 Class Hrs.; 3 Credit Hrs.

22-05 *Aspects of the National Government* — This course will consist of an analysis of the United States Constitution and the distribution of governmental powers. From this foundation the development of the three branches of government will be studied. The Presidency will be considered under the headings of executive powers, military powers, control of foreign affairs and legislative powers. The powers, organization, procedure of Congress and of the Federal judicial system will be examined and some suggested reforms will be discussed. 4 Class Hrs.; 2 Credit Hrs.

22-06 *Municipal Government* — This course constitutes a critical study of local government with particular emphasis upon Massachusetts practice. Considera-

tion is given to the implications of urban growth, the legal status of municipal corporations, politics and popular control, forms of government, administrative organization, municipal functions, federal-state-local relations, metropolitan government and the evaluation and control of municipal services. Civic responsibility and participation is stressed. The student is expected to relate the course content to the political structure of his home community. 3 Class Hrs.; 3 Credit Hrs.

22-08 *Current Political Issues* — This course is designed to present a broader understanding of current national and international issues. Conflicting ideologies and pertinent domestic problems such as financing the government and protecting civil liberties will be studied. The course concludes with an examination of specific problems in the conduct of the foreign affairs of the United States. 3 Class Hrs.; 3 Credit Hrs.

22-11 *Foreign Governments* — An examination is made of political institutions and ideologies in major, contemporary national states. The course deals with the nature and mechanics of political democracy as exemplified within French, English and other states and the Commonwealth Governments through a survey of constitutional development, parties and elections, legislative and executive responsibility, cabinet government, public administration, the legal system, local government and current political problems and policies. 4 Class Hrs.; 4 Credit Hrs.

22-12 *Foreign Governments* — This course includes an examination of the institutions, ideologies and mechanics of totalitarian states. Particular emphasis is placed upon the characteristics of Marxist and Fascist concepts of government as practiced in Russia, Germany and Italy in recent decades. Historical background and postwar developments are stressed. Prep. 22-11; 4 Class Hrs.; 4 Credit Hrs.

22-13 *Political Theory* — Ideas of Justice, Liberty and the organization of the State from the time of the ancient Greeks through Machiavelli will be discussed. The Church-State controversy from the time of the early Church fathers through the Conciliar Movement will be emphasized. 4 Class Hrs.; 4 Credit Hrs.

22-14 *Political Theory* — Beginning with the writers of the Protestant Reformation there will follow a survey of the royalist and anti-royalist theories, the conception of sovereignty, the social contract school, and the attack on natural law by the utilitarians. The course will conclude with a study of the Communist and Fascist political philosophies and western democracy's answer to the challenge. 4 Class Hrs.; 4 Credit Hrs.

22-15 *American Constitutional Law* — This course illustrates through the study of cases the formal adoption and expansion of judicial review. Cases involving political liberty, the principle of the inviolability of contracts, what constitutes due process of law, the police power of the state, and the powers of the state to tax will be made the basis of class discussion. 4 Class Hrs.; 4 Credit Hrs.

22-16 *American Constitutional Law* — A case study is made of the monetary powers of the Federal Government. The interstate commerce clause will be

analyzed as a power to regulate. Application will be made to regulation of business monopolies and of labor unions. The remainder of the course will be given over to recent cases and recent trends. 4 Class Hrs.; 4 Credit Hrs.

22-17 *International Politics* — This course constitutes a study of the fundamental principles underlying the conduct of international politics. Nationalism, imperialism, ideologies, geography, technology, and other foundations of power are analyzed. The problem of world law and order in the contemporary international setting is emphasized. 4 Class Hrs.; 4 Credit Hrs.

22-18 *International Organization* — This course begins with a brief historical survey of significant ideas about international organization. After studying the League of Nations, main emphasis is placed on the structure, functions, and problems of the United Nations and its specialized agencies. The course concludes with an analysis of the world government movement. 4 Class Hrs.; 4 Credit Hrs.

22-20 *Public Administration* — An examination of the existing administrative structure and of the efforts at reorganization will be followed by a discussion of the problem of personnel, including such matters as recruiting, examining, types of training, conditions of employment, morale and retirement systems. Problems of assessment and budgeting will conclude the term's work. 4 Class Hrs.; 4 Credit Hrs.

22-21 *Public Administration* — Planning, supervision and administrative leadership will be discussed. The merits and defects of administrative procedure and administrative adjudication are considered. The problem of holding administrators responsible, through statutory or policy limitations, whether by judicial review of administrative fact finding and procedure, or the more informal attempts through government controls and pressure group influences, will conclude the course. Prep. 22-20; 4 Class Hrs.; 4 Credit Hrs.

22-22 *International Law* — This course deals with the development of international law and its significance in world politics. Topics such as recognition, treaties, state responsibility, war crimes, and interpretation of the United Nations Charter are studied. Problems inherent in modernizing the law of nations are stressed. 4 Class Hrs.; 4 Credit Hrs.

22-23 *American Foreign Policy* — This course concentrates on the role of the United States in world politics, principally since the end of World War II. An analysis of the governmental mechanism for the conduct of United States foreign affairs, fundamental factors affecting American foreign policy and the major problems confronting the United States receive stress. 4 Class Hrs.; 4 Credit Hrs.

History

23-01 *Western Civilization* — This course traces the growth of human culture and civilization from palaeolithic stone age cultures to the height of Greek democracy developed in Athens. The religious and institutional heritage bequeathed by the Sumero-Babylonian and Egyptian civilizations and the

political, artistic and philosophical contributions of the Greeks to western civilization receive emphasis. Ancient solutions to analogous modern problems relates this course to life in the 20th century. 4 Class Hrs.; 4 Credit Hrs.

23-02 *Western Civilization* — This course includes the study of Roman civiliza- tion and its decline. Study of the antecedents, rise, and growth of the Christian religion is an important section of this course. The development of mediaeval institutions, including feudalism, serfdom, universities, and the Papacy, receive stress. The loss of political liberty and economic security, the collapse of learn- ing and the rule of law consequent upon the breakdown of Roman civilization are compared with world trends in the 20th century. Prep. 23-01; 4 Class Hrs.; 4 Credit Hrs.

23-03 *Western Civilization* — This course studies the disintegration of feudalism and the rise of national states; the decline of papal power and the rise of national churches; the development of learning to produce the Renaissance and the Age of Reason; the Copernican, Cartesian, and Newtonian intellectual revolutions; and the revival of commerce and trade giving rise to the establishment of the capitalistic economic system. The rebuilding of western civilization for the third time makes possible frequent reference to 20th century potentialities. Prep. 23-02; 4 Class Hrs.; 4 Credit Hrs.

23-04 *Western Civilization* — This course describes the practical results in Europe of the Newtonian intellectual revolution and the reactions against that revolution and its practical results. The practical results include the French Revolution, the 19th century nationalist movement, and the economic philosophy of the classical economists. The reactions against Newtonianism include the Wesleyan, Romantic and Oxford movements, and the collectivist and evolution- ary philosophies of the 19th century. Study of the industrial revolution and the Darwinian intellectual revolution makes the 20th century intelligible. 4 Class Hrs.; 2 Credit Hrs.

23-05 *Recent American History* — The contending political, economic and social forces in American domestic history of the 20th century and America's rise to world leadership are the main themes of this course. This takes the student from McKinley laissez-faire through the Fair Deal, and from the emergence of the United States as a world power in the early 1900's to its present position of dominance. 6 Class Hrs.; 3 Credit Hrs.

23-06 *Recent European History* — The contemporary era of conflict since 1914 is treated in this course. A discussion of Darwinian concepts which influence the 20th century is followed by a detailed study of the varied applications of these ideas in the major European states. The course deals briefly with military aspects of both world wars and with postwar attempts to secure lasting peace. The Soviet Russian regime and basic Communist beliefs are examined in detail to provide an understanding of contemporary world developments. 3 Class Hrs.; 3 Credit Hrs.

23-08 *Contemporary Orient* — This course concerns 20th century Asia, its prob- lems and its basic civilization. Modern India, China, and Japan receive most emphasis. The social and religious aspects of Hinduism, the economic and

population problems, and the character of British rule form the background for the study of Gandhi's non-violent war of independence. The Chinese struggle against foreign imperialism is seen against the backdrop of the Japanese-American quarrel over the Open Door as the basis for the rise of communist China. 3 Class Hrs.; 3 Credit Hrs.

23-09 *History of Ancient Greece* — This course concerns the origins and development of Greek civilization. The education in civilization afforded the barbarian Hellenic invaders of the Aegean area by the pre-hellenic Minoans; the political evolution of Hellenic society from tribe to city state organizations; the growth and application of Greek religious, ethical, and political ideas; the development and ultimate clash of totalitarian and democratic forms of government, resulting in both the apogee and the decline of Greek civilization, are basic to this course. Prep. 23-01; 4 Class Hrs.; 4 Credit Hrs.

23-10 *History of Rome* — The content of this course divides itself equally between the study of the rise of Roman power under a republican form of government and the decline of that power under the imperial form of government. Special inquiry is made into the social, economic, intellectual, artistic, and religious expressions of these two phases of Roman political history. Prep. 23-02; 4 Class Hrs.; 4 Credit Hrs.

23-11 *Eighteenth Century Europe* (1700–1814) — This course begins with a discussion of the Age of Enlightenment, shows the application of Newtonian concepts to such varied fields as religion, economics, government, and agriculture, and then examines the resulting social upheavals.

The French Revolution is traced from the attack on the Bastille, through the days of Robespierre's controversial Republic of Virtue, till the close of the Napoleonic Empire. Special emphasis is placed upon the social and intellectual significance of the Revolutionary Period. 4 Class Hrs.; 4 Credit Hrs.

23-12 *Nineteenth Century Europe* (1814–1914) — This course deals with Europe during a century of comparative peace but tremendous social change. After examination of the period of reaction following the Congress of Vienna, attention shifts to those forces transforming European society — especially the Industrial Revolution and Nationalism. Special emphasis is placed upon intellectual movements, such as Liberalism and Socialism. The various social, economic and political factors which led to World War I are analyzed. 4 Class Hrs.; 4 Credit Hrs.

23-13 *England to 1720* — This course is a study of English history from its beginnings to the Age of Walpole. Special emphasis is placed upon the relations between church and state before, during, and after the English Reformation, upon the growth of 17th century English social classes from their feudal basis, and upon the origin and development of the English constitution and political institutions. Personalities chiefly instrumental in the promotion of English liberties receive special study. 4 Class Hrs.; 4 Credit Hrs.

23-14 *England Since 1720* — This course begins with the study of the Newtonian intellectual revolution as providing the rationale for majority English action during the 18th and much of the 19th centuries. The agricultural revolution and

industrial revolution set the stage for England's *Age of Reform* in the 19th
century. Study of the Darwinian intellectual revolution, imperialism and col-
lectivism help to make 20th century world wars intelligible, as well as to form
the background explaining the emergence of England as a socialist democracy.
4 Class Hrs.; 4 Credit Hrs.

23-15 *English Constitutional History* — The English constitution and common
law; local government versus central government; the origin and growth of
Parliament; the development of the British cabinet system; and a comprehensive
study of statutes and documents. 4 Class Hrs.; 4 Credit Hrs.

23-16 *American Constitutional History* — The historical development of the
United States Constitution, with particular emphasis on its progressive adjust-
ment to the changing social and economic order. 4 Class Hrs.; 4 Credit Hrs.

23-17 *American History to 1820* — The prime objective in this course is to
demonstrate the foundations and early development of modern American insti-
tutions, ideals and practices. Starting with the earliest settlements of various
nationalities, it goes on to take up the English predominance, the development
of a distinct American character, the break with England, and the struggle to
form a nation, the second war for independence, the gradual evolution of
American democracy. 4 Class Hrs.; 4 Credit Hrs.

23-18 *The United States, 1820-1890* — The chief topics of study in this course
are the westward movement, the industrialization of the Northeast, and Jack-
sonian Democracy; the struggle between Jeffersonianism and Hamiltonianism;
the background, the rise, and the development of the sectional problem; the
victory of the industrial North over the agricultural South; the great era of
economic expansion and the problems, perils and protests of the '70s and '80s.
4 Class Hrs.; 4 Credit Hrs.

23-19 *Latin America to 1810* — The course begins with a study of pre-Conquest
America and of the European background of Spanish and Portuguese coloniza-
tion of the New World. It goes on to the exploration and settlement of Latin
America, the establishment of colonial institutions, and social and intellectual
life in the colonies. The course is concluded with a study of the forces that gave
rise to the Wars for Independence. 4 Class Hrs.; 4 Credit Hrs.

23-20 *Latin America Since 1810* — This course is designed to give an understand-
ing and appreciation of Latin America rather than a detailed history of all the
countries. The Wars for Independence, the founding of the new nations, and
the rise of caudillism are examined in detail. A study is made of representative
caudillos. Significant political and cultural developments and international
affairs receive careful consideration. Special attention is paid to relations with
the United States. 4 Class Hrs.; 4 Credit Hrs.

23-25 *Eastern Civilization to 1300* — This course concerns the origin and develop-
ment of civilization in China, India, Iran and Japan to the 13th century A.D.
New Chinese and Indian archaeological evidence, those developments which
resulted in the emergence in positions of social pre-eminence of the scholar in
China, the soldier in Japan, and the priest in India, the basic philosophical and

religious ideas before and during the rise and spread of Buddhism, and the classical literature of the East in historical perspective are stressed.   4 Class Hrs.; 4 Credit Hrs.

23-26 *Eastern Civilization 1300–1900* — This course reviews the basic essentials of Indian, Chinese and Japanese civilizations and the further development of these civilizations under the impact of Islamic conquest in India and western civilization in all three areas.   The culture conflict that resulted from these impacts forms an important aspect of this course as well as the cultural synthesis resulting from the conflict.   The era of European imperialism in Asia in the 19th century is also stressed.   4 Class Hrs.; 4 Credit Hrs.

23-28 *History of Primitive Religion* — This course reviews the more important theories of Primitive Religion, including the question of the origin of religion, and then examines these theories in the light of anthropological studies into the actual religious beliefs and practices of the modern, living, contemporary human societies in Australasia, Africa, Asia, the arctic, and the American continents.   3 Class Hrs.; 3 Credit Hrs.

23-29 *History of the State Religions of Antiquity* — This course traces and analyzes the earliest prominent historical growth in religion beyond the primitive by which the government of the state undertook, by means of ritual and sacrifice, to insure the well being of its citizenry.   Variations in the development of state religion will be seen in ancient Egyptian, Sumero-Babylonian, Greek, Roman, Chinese, Japanese, and the Amerindian states in Mexico and Peru, all of which are studied in this course.   3 Class Hrs.; 3 Credit Hrs.

Philosophy

24-01 *Introduction to Philosophy* — Basic meanings, issues, and structures are first presented.   The chief fields, the interpenetrations with the several arts and sciences, the schools of thought, and the methodologies are then studied.   Presented both as a body of knowledge and as a way of thinking, philosophy is viewed in this course as a set of data and values essential to the better understanding of human experience.   Epistemological and teleological considerations are emphasized.   4 Class Hrs.; 4 Credit Hrs.

24-02 *Problems of Philosophy* — Problems arising both from what we do know and from what we do not know about the complex nature of human experience are studied and systematized.   Data from such fields as semantics, logic and psychology are introduced to throw light on the problems at hand.   The persistent problems in epistemology, teleology and metaphysics are examined.   The validity of knowledge, the mind-body dilemma, and freedom of will are representative topics.   Prep. 24-01; 4 Class Hrs.; 4 Credit Hrs.

24-03 *History of Philosophy* — Historical survey, beginning with the early Greek period.   The personalities and principles are studied as a basis for constructing a continuing sense of philosophical thought and comparative analysis.   The course progresses through the patristic and scholastic eras.   4 Class Hrs.; 4 Credit Hrs.

24-04 *History of Philosophy* — Studying the transitional era following the Mediaeval period, the historical survey considers the great ideas and systems of thought down through the modern era. Special attention is given present-day contributions. Prep. 24-03; 4 Class Hrs.; 4 Credit Hrs.

24-05 *Philosophy of Religion* — Types of religious belief and practice are analyzed and evaluated from the philosophical point of view. Problems related to the nature of God, validity of religious claims, human freedom, immortality, and natural evil are studied. Theological and ethical considerations are introduced. 4 Class Hrs.; 4 Credit Hrs.

24-06 *Logic* — Modified or practical logic is stressed in this course; formal and classical structures are given limited attention. Fallacies resulting from semantic confusion and methodological error are noted. The meanings of causality and the several types of thinking are examined. Practice drills in effective thought processes and clearer verbalization are emphasized. 4 Class Hrs.; 4 Credit Hrs.

24-07 *Foundations of Philosophy* — Philosophy as a way of thinking, as well as a set of data, is presented in light of its nature, methodology, and schools of thought. Philosophical approaches to problems of knowledge, human relations, and value judgments are studied. The interpenetrations between philosophy and science are emphasized. The two basic subdivisions in the course consist of ethics and metaphysics. 3 Class Hrs.; 3 Credit Hrs.

24-08 *Foundations of Philosophy* — A continuation of 24-07. The two basic subdivisions in this second half consist of principles and problems in social philosophy and in the philosophy of religion. Prep. 24-07; 3 Class Hrs.; 3 Credit Hrs.

24-13 *Ethics* — To clarify the meaning of morality in social relations is the aim of this study. Right and wrong conduct is analyzed in the light of the highest values for human society. Moral laws are discussed, and the various systems of ethics are evaluated. Scientific attitudes are encouraged in order that one's moral judgments may be compatible with one's best reflective thought. 4 Class Hrs.; 4 Credit Hrs.

24-14 *Ethics* — Problems arising from differences in moral standards found in the various social groups will be examined. The question of ethical relativism and determinism will be considered. A selected number of specific problems in social ethics will be discussed. 4 Class Hrs.; 4 Credit Hrs.

Psychology

25-01 *Introductory Psychology* — This course with its companion course, General Psychology (25-02), presents the major concepts from most areas of psychological investigation. In this first term the emphasis is placed upon the experimental approach to the study of behavioral data including growth and development, learning, perception and motivation. 4 Class Hrs.; 4 Credit Hrs.

25-02 *General Psychology* — Continuing the emphasis on general concepts, this course considers the sensory basis of response, individual and group differences, mental testing, attitude formation, and personal adjustment. Prep. 25-01; 4 Class Hrs.; 4 Credit Hrs.

25-04s *Social Psychology* — The relationship of man to the group; a study of his patterned social behavior, his morale, customs and myths, his social struc-tures and institutions, and his conscious and unconscious motives and motivation. Prep. 25-02; 5 Class Hrs.; 2½ Credit Hrs.

25-05s *Applied Psychology* — Principles of psychology related to industry, personnel, education, the professions, and personality development in everyday life. Prep. 25-02; 5 Class Hrs.; 2½ Credit Hrs.

25-07 *Psychology* — This is an introduction to psychology. The aim is to present to engineers a broad overview of the wide and varied interests, efforts, pursuits and problems of psychology and psychologists. Among those discussed are such key problems as growth and development, motivation, individual differ-ences, measurement, and statistical concepts, psychology of sensation and perception. Wide general reading will be required. 3 Class Hrs.; 3 Credit Hrs.

25-08 *Psychology* — A continuation of 25-07. Selected topics for discussion emphasize the psychology of group behavior, personality development and integration. Wide reading will be required. Prep. 25-07; 3 Class Hrs.; 3 Credit Hrs.

25-09 *Statistics in Psychology* — An introductory course dealing with elementary descriptive statistics, graphs, significant numbers, measures of central tendency and dispersion, types of distributions, and elementary correlation. Laboratory work in computational techniques and the use of computing machines will be included. Prep. 25-02; 4 Class Hrs.; 4 Credit Hrs.

25-10 *Statistics in Psychology* — An advanced course in which consideration is given to product moment, biserial, tetrachoric, and rank order correlation. Errors of sampling, statistical hypotheses, and tests of significance are treated with reference to experimental methods in psychology and education. Prep. 25-09; 4 Class Hrs.; 4 Credit Hrs.

25-11 *Individual Differences* — An account of the scientific principles basic to the investigation of human differences. Attention is directed to the history of the field, the techniques which have evolved, and the bearing which this field has upon the special disciplines within psychology, such as experimental, educational, clinical, measurements, and child. Prep. 25-02; 4 Class Hrs.; 4 Credit Hrs.

25-12 *Experimental Psychology I* — This course emphasizes research methods and techniques for investigating the conditions of learning. Examples of topics which are covered are Learning as a function of Motive-Incentive conditions, age, sex, kind of material, amount of material, and the mode of attack. These factors are considered in the light of current learning theory. Laboratory reports are required. Prep. 25-02; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

25-13 *Experimental Psychology II* — This course emphasizes methodology. Topics covered in class and laboratory sessions include attention, the nature of illusions, perception of form, color, and space, and reading as a problem in perception. Laboratory reports are required. Prep. 25-02; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

25-14 *Experimental Psychology III* — The structure and function of the sense organs. Emphasis is placed on the methods of investigating the sensory processes of vision, hearing, olfaction, taste, and the skin senses. Laboratory reports are required. Prep. 25-02; 3 Class Hrs.; 3 Lab. Hrs.; 4 Credit Hrs.

25-15 *Educational Psychology* — The introductory course in educational psychology is studied as an applied psychology in the field of education. It is intended not only for the preparation of future professional teachers, but for all those who may have an interest in the education of the youth. Child development and personality, guidance, theories of learning and motivation, and basic principles of mental hygiene are special topics which are surveyed in this course. Prep. 25-02; 4 Class Hrs.; 4 Credit Hrs.

25-16 *Educational Psychology* — Problems indigenous to the concept of the school as an important aspect of the growing child's environment are considered. The course is research oriented in the sense that information on such problems is sought in the research literature. Learning, motivation, pupil adjustment, subject disability, and pupil evaluation are some of the areas explored. Prep. 25-15; 4 Class Hrs.; 4 Credit Hrs.

25-17 *Measurements I* — A practical workshop course in the theory, selection, administration, scoring, and interpretation of individual intelligence tests. Each student is required to test a substantial series of subjects provided by the department. Training will be given in the Wechsler-Bellevue Scale, the Stanford-Binet, and various developmental scales. Prep. 25-09; 4 Class Hrs.; 4 Credit Hrs.

25-18 *Measurements II* — An intensive workshop course in the theories underlying personality evaluation by psychometric means. Each student will be required to act as a subject for and administer a variety of personality instruments. The course will emphasize the clinical approach to the study of the individual personality. In addition to obtaining thorough familiarity with conventional questionnaires and tests in the field of personality, some introductory information concerning projective techniques is provided. Prep. 25-09; 4 Class Hrs.; 4 Credit Hrs.

25-19 *Measurements IV* — A workshop course in the theories underlying aptitude testing. The course will deal with objective evaluative instruments, with special emphasis upon the use of standardized testing procedures in industry. Each student will be required to act as a subject, and to administer and score a variety of tests. Prep. 25-02; 4 Class Hrs.; 4 Credit Hrs.

25-20 *Measurements III* — More intensive practice with the Wechsler-Bellevue and the Binet and their alternate forms. Experience will be provided with group tests of general intelligence, scholastic aptitude, and with various other psychometric instruments and techniques. Emphasis will be upon the development of

skill in the selection of instruments appropriate to the case.   Prep. 25-17; 4 Class Hrs.; 4 Credit Hrs.

25-29 *Psychology of Personality* — A systematic study of normal personality growth.   Approaches to the understanding of personality are made through a review of the physical, mental, and emotional development of the individual and of the social influences upon him.   Several of the more prominent theories in the field are considered and some case material is presented.   Prep. 25-02; 4 Class Hrs.; 4 Credit Hrs.

25-31 *Abnormal Psychology* — The study of personality deviants.   Attention is directed to the historical development of the field with emphasis upon the development of theories of abnormal behavior and their classification, the rise of institutional care of the mentally ill, and the beginnings of humanitarian concepts of deviancy.   Prep. 25-29; 4 Class Hrs.; 4 Credit Hrs.

25-32 *Abnormal Psychology* — This course consists of systematic exploration of concepts of normality and abnormality.   The etiology and dynamics of the various patterns of psychological disturbances are described and discussed.   The relationship existing between psychological disturbances and the socio-cultural order are carefully defined.   Prep. 25-31; 4 Class Hrs.; 4 Credit Hrs.

25-33 *Social Psychology* — A study of the psychological principles underlying human relations with emphasis upon motivation, nature and development of groups, social movements and institutions, antisocial behavior, social controls, leadership, co-operation, war, propaganda, and prejudice.   In addition, the course seeks to elucidate the methods and techniques which yield trustworthy data regarding social phenomena.   Prep. 25-02; 4 Class Hrs.; 4 Credit Hrs.

25-34 *Child Psychology* — An introduction to the growth and development of infants and young children.   Systematic study is made of their characteristic patterns of behavior, motivations, and needs.   Prep. 25-02; 4 Class Hrs.; 4 Credit Hrs.

25-35a *Industrial Psychology* — A study of the basic principles and techniques of the application of psychology to industrial efficiency and employee satisfaction.   The presentation is thoroughly practical and realistic, with emphasis upon psychological tools that management finds serviceable in the selection, placement and motivation of employees.   Attention is paid to the role of psychological tests in choosing employees, the prevention of industrial "fatigue," the management of specific problems such as absenteeism, voluntary restriction of output, accident-proneness, alcoholism, recreation and other special problems. The role of government and union in industrial operations is taken into account. Prep. 25-02; 3 Class Hrs.; 3 Credit Hrs.

25-36a *Industrial Psychology* — An intensive course in personnel counseling and other preventive and remedial procedures for keeping the worker on the job and producing at high efficiency.   Emphasis is placed upon working with the problem individual, but some attention is given to methods and techniques for dealing with problems in the group situation.   Actual problems, as they have occurred in various industrial settings, are presented by films and records.   Prep. 25-02; 3 Class Hrs.; 3 Credit Hrs.

25-37 *Child Psychology* — A further systematic exploration of developing patterns of childhood and adolescent behavior and their implications for adult life. Parental functions, problems pertaining to child rearing and their relationship to society are described. Prep. 25-34; 4 Class Hrs.; 4 Credit Hrs.

25-38 *Physiological Psychology* — A survey of the pertinent physiological fact and theory oriented to the relation of neuro-anatomy and psychology. The structural and functional aspects of receptors, muscles, glands, and nervous tissue (peripheral nerves, spinal cord and brain) are emphasized. Permission of instructor required. Prep. 25-02; 4 Class Hrs.; 4 Credit Hrs.

25-39 *Physiological Psychology* — A continuation of 25-38. The integrative action of the central nervous system, and the problem of variability of behavior are the main topics. Permission of instructor required. Prep. 25-38; 4 Class Hrs.; 4 Credit Hrs.

25-41 *Advanced Psychology* — The current status of psychology among the sciences is considered in the light of its history. Emphasis is placed upon the period from Descartes (circa 1650) to the early 1900's and attention is directed to the philosophical and physiological antecedents of the emergence of psychology as a scientific discipline. Prep. two years of Psychology; 4 Class Hrs.; 4 Credit Hrs.

25-42 *Advanced Psychology* — A critical survey of the major schools of psychology which have influenced the development of modern psychology. Contemporary systematic trends are evaluated in the light of their historical development. Major schools or systems considered are Structuralism, Functionalism, Behaviorism, Gestalt Psychology and the Depth Psychologies. Prep. 25-41; 4 Class Hrs.; 4 Credit Hrs.

25-50 *Reading Improvement* — A course designed to assist students who wish to improve their study and reading habits. Areas to be considered will be informational concepts, reading rate, comprehension and vocabulary and study techniques. Specific exercises will be based upon a thorough analysis of the individual student's needs. 3-5 Class Hrs.; 0 Credit Hrs.

25-61, 25-62 *Directed Study* — Independent study under the direction of a member of the department. Open to above average seniors majoring in Psychology, with the approval of the chairman of the department. Credit to be arranged.

25-71, 25-72, 25-73, 25-74 *Seminar in Psychology* — Discussion of current problems in Psychology. Topics will be introduced by members of the department and by guest lecturers. Required of Juniors and Seniors majoring in Psychology. 2 Class Hrs.; 1 Credit Hr. (each term).

Sociology

26-01 *Principles of Sociology* — The evolution of man, society, and culture; comparison of primitive, historic, and modern cultures; the races of mankind and their distribution. Basic concepts and theories of anthropology are also studied. 4 Class Hrs.; 4 Credit Hrs.

26-02 *Principles of Sociology* — Continuation of 26-01. The study of group life and institutions, social organization, and processes of adjustment. Basic theories and concepts of sociology are stressed. Prep. 26-01; 4 Class Hrs.; 4 Credit Hrs.

26-03s *The Family* — The historical development of the family as seen in our own and other cultures; modern domestic institutions; courtship practices; domestic relationships; the role of the child; problems of family life. 5 Class Hrs.; 2½ Credit Hrs.

26-05 *Social Problems* — A survey for students taking only one course in sociology aimed at giving them an understanding of American culture and society so that they may better understand the social problems arising there-from. Among the problems covered are crime, racial and religious prejudice and discrimination, physically handicapped, the family, political deviations, and natural resources. 3 Class Hrs.; 3 Credit Hrs.

26-06 *Physical Anthropology* — A survey of the races of mankind: a considera-tion of the extinct and living varieties, together with an analysis of their relation-ships, classifications, and distribution over the world in the past and the present. 3 Class Hrs.; 3 Credit Hrs.

26-07 *Cultural Anthropology* — Introduction to contemporary primitive peoples: cultural patterns, diffusion, and functions. Consideration of modal personality and deviants as reflected in primitive cultures. Analysis of the cultural diversity of contemporary social groups. 3 Class Hrs.; 3 Credit Hrs.

26-09 *American Culture* — A study of modern American culture and its major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Consideration is also given to social classes and stratification, mobility, and individualism. The parts played by subcultures and cultural integration are also examined. Prep. 26-02; 4 Class Hrs.; 4 Credit Hrs.

26-10 *American Inter-Group Relations* — The analysis of American society and culture from the point of view of nationality and racial groups within the United States, tracing their history, development, and probable future as well as their influence on national life and their place in the world today. Consideration is also given to cultural and religious cleavages in American society and the prob-lem of assimilation. Emphasis will be given to a few selected nationality groups, the Negro, and the American Indian. Prep. 26-02; 4 Class Hrs.; 4 Credit Hrs.

26-11 *Social Problems* — A study of the elements, processes, structures, and relationships involved in social problems and consequent public reactions. Specific subjects covered include natural resources, physical and mental health problems, alcoholism, and poverty. Prep. 26-02; 4 Class Hrs.; 4 Credit Hrs.

26-12 *The Individual and Society* — Life-history studies in the adjustment of the individual to society, dealing basically with constitutional, social, and cul-tural factors affecting personality development. The relationship of the indi-vidual to this group in terms of status, roles, rights, and obligations as these pertain to the critical periods in the cycle of life is also studied, as is the function of the individual in social change and the impact of social control on personal interests. Prep. 26-02; 4 Class Hrs.; 4 Credit Hrs.

26-16 *Criminology* — A study of the patterns and evolution of criminal behavior, the social forces involved, and the development of the individual criminal. Also included is an analysis of the administration of criminal justice: law, courts, police, prisons. Local penal institutions are visited. Prep. 26-02; 4 Class Hrs.; 4 Credit Hrs.

26-17 *Urban Sociology* — A study of the modern American city based on its historical background and comparison with other cities of the world. Its types, social values, and pathological elements are discussed, as are methods of city planning. Prep. 26-02; 4 Class Hrs.; 4 Credit Hrs.

26-18 *Race and Culture Contact* — An analysis of these problems in areas of the world outside the United States, with emphasis on Latin America and present and previous colonial areas of Africa and Asia; an analysis of the cleavages in the various countries studied and the processes of assimilation. Among the areas studied will be Mexico, Brazil, British West Africa, India, and the Union of South Africa. Prep. 26-02; 4 Class Hrs.; 4 Credit Hrs.

26-19 *Sociological Theory* — A history of sociological thought from its beginning up to the early part of the 19th century. Origins, aims, and accomplishments of the social science movement are studied. Special attention is given several of the earlier schools of sociological thought. Prep. 26-12; 4 Class Hrs.; 4 Credit Hrs.

26-20 *Sociological Theory* — Beginning with influential theorists of the early 19th century, this course deals with modern and contemporary sociological theories. The contributions of such men as Spencer, Marx, Sumner, Ward, Gumplowicz, Durkheim, Pareto, and Thomas are studied. Prep. 26-19; 4 Class Hrs.; 4 Credit Hrs.

26-22 *Principles of Social Work* — This course introduces the student to the field of social work with a view to part-time or full-time work, either on a voluntary or professional basis, in any of the major social service agencies. Methods and techniques are studied, and practical problems discussed. Representatives from various agencies give occasional lectures. Field trips are offered. Prep. 26-12; 4 Class Hrs.; 4 Credit Hrs.

26-23 *Methods and Problems in Social Research* — A study of the theory and methods of social research with discussion of recent investigations and analysis of the methods used. Open to sociology majors in senior year with approval of department. 4 Class Hrs.; 4 Credit Hrs.

26-61, 62 *Directed Study* — Independent work under the direction of members of the department upon a chosen topic. Limited to qualified seniors preparing in Sociology with approval of department. 4 Credit Hrs. (each term).

26-71 *Seminar* — Contemporary American sociological theory is studied and evaluated. Limited to qualified seniors majoring in Sociology with the approval of the department. 2 Class Hrs.; 2 Credit Hrs.

26-72 *Seminar* — A study of the causative factors of tensions between the several racial and religious groups in American society. Constructive programs are evaluated. 2 Class Hrs.; 2 Credit Hrs.

Fine Arts

27-01 *Ancient Art* — Beginning with a study of the materials and techniques employed by ancient artisans in architecture, sculpture and painting, this course includes a survey of prehistoric art and the arts of ancient Egypt, Mesopotamia, Crete, and Greece. Lectures are illustrated with lantern slides and include brief historical accounts of each period under discussion. 4 Class Hrs.; 4 Credit Hrs.

27-02 *Early Christian and Medieval Art* — This course is a continuation of 27-01, Ancient Art, although the latter is not a prerequisite course. Beginning with Roman art, this course includes a study of Early Christian and Byzantine art, Romanesque and Gothic art. 4 Class Hrs.; 4 Credit Hrs.

27-03 *Italian Renaissance Art* — This course is a continuation of 27-02, Early Christian and Medieval Art, although the latter is not a prerequisite course. Beginning with a survey of Renaissance architecture and sculpture, the course then concentrates on a study of Italian Renaissance painting from Giotto to Raphael. Lectures are illustrated with drawings and lantern slides and include detailed discussions on the materials, techniques, design and composition employed by various artists. 4 Class Hrs.; 4 Credit Hrs.

27-04 *European Art* — A continuation of Course 27-03, this course begins with a survey of North Italian Renaissance art, and includes a study of the architecture, sculpture, and painting of European art up to the end of the nineteenth century. Emphasis is placed upon the contributions of Titian, Tintoretto, Giorgione, Rembrandt, Raphael, Dürer, Gainsborough, Reynolds, and Turner. Lantern slides and museum visits supplement the lectures. 4 Class Hrs.; 4 Credit Hrs.

27-08 *American Art I* — A study of the development of American art from colonial times to about 1860. The object of this course is to acquaint the student with the rise of architecture, sculpture, and painting in America. Lectures include discussion of techniques, styles, methods, and materials employed during the periods considered. Lantern slides and visits to local museums supplement the lectures. 4 Class Hrs.; 4 Credit Hrs.

27-09 *American Art II* — A continuation of Course 27-08, this course begins with the Civil War period and includes a study of American architecture, sculpture, and painting, up to the 20th century. Particular attention is given to the work of Inness, Homer, Eakins, Whistler, Ryder, Sargent, Bellows, Sloan, and their contemporaries. Lantern slides and visits to local museums augment the lecture material. 4 Class Hrs.; 4 Credit Hrs.

27-10 *Decorative Interior Art* — This course is designed to round out the study of art in the United States. Beginning with a study of the decorative interior arts of colonial times, attention is directed toward the development and refinement of the arts up to and including contemporary times. Illustrated lectures are supplemented by studies in local museums. 4 Class Hrs.; 4 Credit Hrs.

27-11 *History of Civilization* — This course is designed to cultivate a knowledge and appreciation of the cultures of ancient times. Beginning with a study of the

early world and prehistoric man, it includes a study of the ancient civilizations of Egypt, Sumer, Assyria, Chaldea, Phoenicia, Palestine and the Aegean World. 4 Class Hrs.; 4 Credit Hrs.

27-12 *History of Civilization* — This course is a continuation of 27-11, History of Civilization. Beginning with a study of Cretan culture and the early Greek tribes, the course includes a comparative analysis of Persian and Greek cultures, the growth and development of the Greek states, Greek art, architecture, science and philosophy, the Hellenistic world, the rise of ancient Rome. Prep. 27-11; 4 Class Hrs.; 3 Credit Hrs.

27-13 *History of Civilization* — This course is a continuation of 27-12, History of Civilization. It includes a study of the Roman Empire, Roman art and architecture, the organization and development of the Early Christian Church, Early Christian and Byzantine art and architecture, the Mohammedan World, the European Feudal Age, and the Christian Crusades. Prep. 27-12; 4 Class Hrs.; 4 Credit Hrs.

27-14 *History of Civilization* — This course is a continuation of 27-13, History of Civilization. Beginning with a study of the art of the Romanesque and Gothic periods, it includes a study of the rise of European nations, the Italian and European Renaissance periods, the Religious Revolt, and the Age of Discovery and Exploration. Prep. 27-13; 4 Class Hrs.; 4 Credit Hrs.

27-21 *Theory of Drawing* — This course is an introduction to freehand lettering and mechanical drawing, beginning with exercises involving the use of drawing instruments. The course includes a study of single stroke Gothic letter; the theory of orthographic projection, elementary problems in orthographic projection, and tracing in ink. 1 Class Hr.; 2 Lab. Hrs.; 2 Credit Hrs.

27-22 *Pictorial Drawing and Sketching* — A continuation of 27-21, which is a prerequisite, this course comprises a study of mechanical pictorial drawing-isometric, oblique, and perspective, as an introduction to freehand sketching in pencil, charcoal, and chalk. 1 Class Hr.; 2 Lab. Hrs.; 2 Credit Hrs.

27-23 *Pastel and Water Color Painting* — This course is a continuation of 27-22 although the latter is not a prerequisite. Beginning with freehand sketching in charcoal and chalk, this course includes a study in the theory of color and pastel painting. 1 Class Hr.; 2 Lab. Hrs.; 2 Credit Hrs.

27-30 *Elementary Drawing and Lettering* — An introductory study of mechanical drawing and lettering, this course is designed to provide fundamental training upon which other applied art courses may be built. The work of the course includes practice in the use of drawing instruments, Gothic, Roman, and Script lettering, elementary mechanical drawing problems, and tracings in ink. 2 Class Hrs.; 4 Lab. Hrs.; 4 Credit Hrs.

27-31 *Pictorial Drawing* — A continuation of Course 27-30 which is a prerequisite, this course includes studies in isometric drawing, oblique and cabinet drawing, and problems in mechanical perspective. The course concludes with some practical applications of each in the field of art and industry. 2 Class Hrs.; 4 Lab. Hrs.; 4 Credit Hrs.

27-32 *Freehand Sketching* — Beginning with an analysis of sketching instruments, materials, and techniques, this course includes studies of delineation, form drawing, and color value in still life, landscape, and portraiture. Problems include practice with lead pencil, charcoal, crayon, and chalk. 6 Lab. Hrs.; 4 Credit Hrs.

27-33 *Theory of Color I* — This course is designed to acquaint the student with the techniques and use of water color. Beginning with studies in color composition, it includes practice in tonal value, color intensities, hues, cast of reflected shadows and studies in still life by use of diagrams and drawings. 6 Lab. Hrs.; 4 Credit Hrs.

27-34 *Theory of Color II* — A continuation of Course 27-33 which is a prerequisite, the media of study in this course are water color, pastels, and oils. The work of the course includes discussion and practice of techniques in the studio, and training in the use of all three media for still life studies and landscape. 6 Lab. Hrs.; 4 Credit Hrs.

27-35 *Oil Painting* — A continuation of 27-34, this course concentrates on the modes and techniques of oil painting. The work of the course includes paintings of still life, landscape, and portraiture. Instructional discussions are augmented by classroom and studio demonstrations by professional artists, and by visits to local museums. 6 Lab. Hrs.; 4 Credit Hrs.

27-36 *Graphic Arts I* — This studio course is devoted to the study and practice of printing and printing processes. Beginning with lectures and illustrations of printing media and techniques, students practice elementary techniques in the studio beginning with woodblock carving, and continuing through etching, dry point, and engraving. 6 Lab. Hrs.; 4 Credit Hrs.

27-37 *Graphic Arts II* — An advanced course in Graphic Arts, this course is a continuation of Course 27-36, the latter being a prerequisite. Studio work concentrates on advanced engraving, lithography, tinting processes in printing, and completion of special work projects under the guidance and direction of the instructor. 6 Lab. Hrs.; 4 Credit Hrs.

27-38 *Design for Industry* — This studio course concentrates on decorative designs and their application to ceramics, glass, furniture, textiles, paper, or metal products. Beginning with studies of decorative designs and patterns, students apply techniques they have learned to work projects of their own choosing. An analysis of the production processes involved in manufacture completes the work of the course. 6 Lab. Hrs.; 4 Credit Hrs.

27-39 *Design for Advertising* — This course makes use of previous training in the applied art courses listed above, including drawing, sketching, lettering, design, composition, coloring, and the use of the various instruments used in rendering. Studio instruction includes the use of the air brush, and work projects are guided by instruction in the basic requirements of display advertising. 6 Lab. Hrs.; 4 Credit Hrs.

Music

28-01 *Music Appreciation* — The principal concern of this course is teaching the student a technique for listening to music creatively. Representative works from the standard repertory are analyzed with emphasis on listening to music actively. 4 Class Hrs.; 4 Credit Hrs.

28-02 *Introduction to Music History* — This course deals with the major developments in music history from Gregorian Chant through the Romantic period. Emphasis is placed on the comparison of the various styles of each century. 4 Class Hrs.; 4 Credit Hrs.

28-03 *Music Fundamentals* — Basic facts concerning tone relationships, music notation, and elementary chord structure are the subject matter of this course. Class sessions are devoted to sight-singing and ear training. 4 Class Hrs.; 4 Credit Hrs.

28-04 *Musical Forms* — The more common musical forms such as the sonata, theme and variations and rondo are discussed and analyzed. Examples from the standard repertory are played in class and assigned as outside listening. Emphasis is placed on hearing the formal structure of the composition. Prep. 28-01 or 28-02; 4 Class Hrs.; 4 Credit Hrs.

28-05 *The Classical Symphony* — Structural development of the symphonic form during the classical period is emphasized. The most significant symphonies of Haydn, Mozart and Beethoven are used as the basis for discussion. Prep. 28-01, 28-02, 28-03; 4 Class Hrs.; 4 Credit Hrs.

28-06 *The Classical Opera* — A survey course in which operatic forms and developments are traced, with particular attention to the opera forms of Haydn and Mozart. The student will study in detail Haydn's "Orfeo," Mozart's "Don Giovanni," "The Marriage of Figaro," "The Magic Flute," and "Cosi Fan Tutti" as well as one example of the commedia dell'arte, Rossini's "The Barber of Seville." The student will be required to listen to other works outside of class. Prep. 28-02; 4 Class Hrs.; 4 Credit Hrs.

English

30-01 *English I* — A review of basic sentence structure and the grammatical functions of clauses and phrases, followed by a study of effective sentence writing, paragraph development, and reading techniques. Theme assignments are planned to develop practical skill in each of the phases studied. 3 Class Hrs.; 3 Credit Hrs.

30-02 *English I* — A study of the structure and organization of written compositions: outlining, development of compositions by phases, and the analysis of expository writings. Experimental work in each phase is carried out by means of theme assignments and readings. Prep. 30-01; 3 Class Hrs.; 3 Credit Hrs.

30-03 *English I* — A study of the problems peculiar to each of the four main types of discourse: exposition, description, narrative, and argument. Theme work includes, in addition to these basic types, some assignments in the framing of reports and the writing of business letters. Prep. 30-02; 3 Class Hrs.; 3 Credit Hrs.

30-04 *Introduction to Literature* — A study of the aims and techniques of various common types of literature: the play, the short story, lyrical and narrative poetry, and the literary essay. Instructional methods include assigned reading and writing of short critical reports. 5 Class Hrs.; 2½ Credit Hrs.

30-05 *Public Speaking* — The study and practice of the basic principles and techniques of effective modern speaking. The class is organized as a functional group. Emphasis is on conversational delivery and clear, concise composition. Group procedures, impromptu speaking, and the handling of short expository forms are practiced. The course trains for the communication requirements of everyday business, professional, and social life. 4 Class Hrs.; 4 Credit Hrs.

30-06 *Public Speaking* — A continuation of 30-05 with emphasis upon speech patterns which involve effective discussion, the study of fundamental issues, analysis, evidence, and reasoning as factors in convincing and persuading people. Prep. 30-05; 4 Class Hrs.; 4 Credit Hrs.

30-07 *Effective Speaking* — A short practical course designed for engineers. The fundamentals of speaking, conferring and reporting are studied and practiced. The class is organized as a functional group with officers and agenda. Theory is minimized; practice emphasized. 3 Class Hrs.; 3 Credit Hrs.

30-09 *Report Writing* — The study and practice of the principles and skills involved in planning, writing, and delivering modern reports. Achievement of purpose, format, organization, content, style, and documentation are principal targets of achievement. 3 Class Hrs.; 3 Credit Hrs.

30-10 *Problems in Writing* — A course in the clear, accurate, and effective presentation of factual data, opinions, policies, and judgments. Emphasis is laid on sound organization, completeness of data, and pointed expression. 3 Class Hrs.; 3 Credit Hrs.

30-17 *Literature* — A course consisting of a careful study of four of Shakespeare's plays. The purpose of the course is twofold: to awaken an interest in and an appreciation of literature, and to develop in the student effective reading habits which will be serviceable to him in any reading he may do hereafter. 3 Class Hrs.; 3 Credit Hrs.

30-18 *Literature* — A course which parallels 30-17 in purpose and method, treats four nineteenth century American novels and develops in students the ability to judge whether the author has been accurate in observation, skillful in expression, and sound in ethical implication. 3 Class Hrs.; 3 Credit Hrs.

30-21 *Intermediate Writing* — A practice course in the writing of the shorter forms of composition. Each student will be given considerable latitude in writing in the field of his individual interest. Student manuscripts will be read and analyzed in class. 4 Class Hrs.; 4 Credit Hrs.

30-22 *Intermediate Writing* — A continuation of 30-12. Approximately a quarter of the work assigned consists of preliminary analysis and completion of a short story for each student on a given conflict problem. Prep. 30-21; 4 Class Hrs.; 4 Credit Hrs.

30-23 *Advanced Composition* — A course designed to meet the needs of advanced students who are interested in literary composition and who have proved their ability in 30-22, Intermediate Writing. 4 Class Hrs.; 4 Credit Hrs.

30-24 *Advanced Composition* — A continuation of 30-23. As in the previous course, class instruction will be supplemented by individual conferences with the instructor. Special attention will be given to the preparation of manuscripts for publication. 4 Class Hrs.; 4 Credit Hrs.

30-27 *Masters of the Drama* — A consideration of the world's outstanding dramatists from Aeschylus to Moliere — their mastery of dramatic techniques, their contribution to the development of the theatre, their influence on their contemporaries, their significance today. Students will be asked to read about fifteen plays, all of them in English. 4 Class Hrs.; 4 Credit Hrs.

30-28 *Masters of the Drama* — A continuation of 30-27. Among the dramatists covered in this course are Congreve, Sheridan, Goethe, Ibsen, Maeterlinck, Strindberg, Hauptmann, Chekhov, Gorky, Pirandello, Shaw, and O'Neill. 4 Class Hrs.; 4 Credit Hrs.

30-29 *Foundations of the English Language* — Ancient and prehistoric origins of the English language. The development of English from and alongside other languages, with some references to Sanskrit, but with special attention to the contributions of Anglo-Saxon and Greek; cognates and derivatives. Application of some of the principles of linguistic science, including phonetics and phonology, to an understanding of many of the phenomena of change in English words. (Previous training in Greek, Latin, French, and German helpful, but not required.) 4 Class Hrs.; 4 Credit Hrs.

30-30 *Foundations of the English Language* — A continued treatment of the principles involved in 30-29, with the addition of Latin in its bearing upon English, and with considerable attention to the influence of accent. An examination of English in its larger elements, and of the informative and symbolic uses of it, with some of the implications of semantics. (Previous training in Greek, Latin, French, helpful but not required.) Prep. 30-29; 4 Class Hrs.; 4 Credit Hrs.

30-31 *Western World Literature* — A survey of the principal writings of the classic period, including the principal Greek and Latin authors from Homer to Lucian, and passages from the Bible. Attention is given to literary force, content, and historical setting. 4 Class Hrs.; 4 Credit Hrs.

30-32 *Western World Literature* — A continuation of 30-31. Included in the readings are literary masterpieces of England, France, Germany, Norway, Spain, Italy, and Russia. 4 Class Hrs.; 4 Credit Hrs.

30-33 *Survey of English Literature* — A survey of English literature to 1800. After a brief study of the social and political background of each literary period,

the writing of the period is considered, and the more important writers are studied and read in detail. The purpose of the course is to give the student an appreciation of English literature as a whole, and an intimate knowledge of its major figures. 4 Class Hrs.; 4 Credit Hrs.

30-34 *Survey of English Literature* — A survey of English literature from 1800 to the present century. The outstanding writers are read, studied, and related to the general background of nineteenth century England. The purpose of the course is to give the student an understanding of the writers who contributed most to the formation and development of modern literature in England. 4 Class Hrs.; 4 Credit Hrs.

30-35 *American Literature to 1860* — A survey of American literature from colonial times to the triumph of the transcendental movement in New England. The work of Bryant, Irving, Cooper, Poe, Emerson, Thoreau, Lowell, Holmes, Longfellow, and Melville will be emphasized. 4 Class Hrs.; 4 Credit Hrs.

30-36 *American Literature after 1860* — Continuing 30-35, the course will consider the rise of realism after the Civil War, the development of American humor, the appearance of local color writers, and modern trends since 1900. Prep. 30-35; 4 Class Hrs.; 4 Credit Hrs.

30-39 *The Seventeenth Century in England* — An historical survey of the literary developments during the first half of the seventeenth century. Assigned readings in drama, lyrical poetry, and criticism are supplemented by lectures on general trends and minor authors not represented in the readings. 4 Class Hrs.; 4 Credit Hrs.

30-40 *The Seventeenth Century in England* — A continuation of 30-39 with special attention to the later works of Milton, the poetry of Dryden, and the theatre of the Restoration. Prep. 30-39; 4 Class Hrs.; 4 Credit Hrs.

30-41 *The Eighteenth Century in England* — An historical survey of the literary developments during the first half of the eighteenth century: the rise of popular journalism; the sentimental comedy; satire and realistic narrative; the beginnings of the novel. 4 Class Hrs.; 4 Credit Hrs.

30-42 *The Eighteenth Century in England* — A continuation of 30-41: the age of Johnson; late eighteenth century poets, novelists, and diamatists. Prep. 30-41; 4 Class Hrs.; 4 Credit Hrs.

30-43 *Nineteenth Century Prose* — An examination of significant prose writers of the early nineteenth century in England and their relation to the social, political, and literary currents of the time, with consideration of background figures like Godwin and Cobbett, the establishment of the great quarterlies and the literary magazines, the Romantic critics and essayists, Coleridge, Lamb, Hazlitt, and DeQuincey, and such transitional writers as Carlyle and Macaulay. 4 Class Hrs.; 4 Credit Hrs.

30-44 *Nineteenth Century Prose* — A continuation of 30-43. Examination of the major prose writers of Victorian England in the work of Thackeray, Newman, Ruskin, Arnold, Huxley, Pater, and Stevenson. 4 Class Hrs.; 4 Credit Hrs.

30-45 *Nineteenth Century Poetry* — A study of Romanticism, its origins, its conflict with classicism, and its contributions to contemporary and later culture. The poetry of Wordsworth, Coleridge, Byron, Shelley, and Keats will be examined appreciatively and critically. 4 Class Hrs.; 4 Credit Hrs.

30-46 *Nineteenth Century Poetry* — A study of the Victorian era with emphasis on Browning and Tennyson as artists and as interpreters of life. Lesser poets to be considered include Arnold, Clough, and the Pre-Raphaelites. 4 Class Hrs.; 4 Credit Hrs.

30-47 *The Modern Novel* — A survey of the modern and contemporary English and American novel, with emphasis on trends and changes in content and technique. Representative novels are read, and a few novelists are studied in detail. 4 Class Hrs.; 4 Credit Hrs.

30-48 *The Modern Drama* — A survey of English and American drama since 1900, considering representative plays and major dramatists and tracing the relationship between drama and history in the twentieth century. 4 Class Hrs.; 4 Credit Hrs.

30-49 *Modern Poetry* — A survey of the principal developments in the prosody, substance, and theory of poetry in England and America since 1912. The chief emphasis of the course will be on the work of the major poets of the period. 4 Class Hrs.; 4 Credit Hrs.

30-51 *Introduction to Journalism* — This course treats the functions of the editorial department and the general tasks of an "inside" man. The student is given extensive practice in the rewriting of news stories. 4 Class Hrs.; 4 Credit Hrs.

30-52 *Introduction to Journalism* — The problems of reporting and news-writing, with written assignments in all types of spot news reporting. Prep. 30-51; 4 Class Hrs.; 4 Credit Hrs.

30-53 *Techniques of Journalism* — Editing the news. The writing of editorials, feature articles, and columns. Prep. 30-52; 4 Class Hrs.; 4 Credit Hrs.

30-54 *Techniques of Journalism* — A general practice course in newspaper writing, the covering of special assignments, and editorial problems. Prep. 30-53; 4 Class Hrs.; 4 Credit Hrs.

30-55 *Vocabulary Building* — This course is concerned mainly with the Greek, Latin, and Germanic elements from which modern English words are made. It includes also some work in the history of the language and types of semantic change. 3 Class Hrs.; 3 Credit Hrs.

30-57 *Introduction to Semantics* — A study of the ways in which language habits affect thinking processes and raise problems in social relationships. 3 Class Hrs.; 3 Credit Hrs.

30-58 *Discussion and Debate* — Practice in the round-table and panel discussion and in intercollegiate types of debate. A study of the techniques of reasoning based upon logic, semantics, and the modern scientific method. 3 Class Hrs.; 3 Credit Hrs.

30-59 *Play Production* — An elementary course designed to teach the prospective director, stage manager, or technician of amateur theatricals presented in schools, churches, and settlement houses the procedures involved in selecting and preparing a play for production. 3 Class Hrs.; 3 Credit Hrs.

30-61 *Shakespeare* —The Elizabethan period, sixteenth century London, and Shakespearean stage and audience, and the actors' companies will be discussed. Shakespeare's life and his development as a dramatist will be carefully considered. Five plays will be intensively studied. 4 Class Hrs.; 4 Credit Hrs.

30-62 *Shakespeare* — Lectures will be given on Shakespeare's language, the text of the plays, Shakespearean criticism, editors' problems, etc. Four plays will be intensively studied. The sonnets will be read and discussed. Prep. 30-61; 4 Class Hrs.; 4 Credit Hrs.

30-63 *Chaucer* — A study of the Canterbury Tales, with careful attention to Middle English vocabulary, historical setting, and the rhythms and devices of Chaucer's poetry. Included in the readings are the General Prologue and seven Tales, with links and prologues. 4 Class Hrs.; 4 Credit Hrs.

30-64 *Chaucer* — This course is principally concerned with *Troilus and Criseyde*, *The House of Fame*, *The Parliament of Fowls* and certain selected parts of *Boece*. Prep. 30-63; 4 Class Hrs.; 4 Credit Hrs.

30-66 *Eugene O'Neill* — A comprehensive course tracing the development of Eugene O'Neill as a playwright and showing the influence of Eugene O'Neill in World Drama. Eugene O'Neill will be evaluated as a writer of tragedy, as a naturalist, and as an experimenter. 3 Class Hrs.; 3 Credit Hrs.

French

31-01 *Elementary French* — A beginner's course stressing the essentials of grammar, practice in pronunciation, and progressive acquisition of a basic vocabulary and idiomatic expressions. 3 Class Hrs.; 3 Credit Hrs.

31-02 *Elementary French* — A continuation of 31-01, with emphasis on the more difficult points of grammar, particularly the uses of the subjunctive mood. Prep. 31-01; 3 Class Hrs.; 3 Credit Hrs.

31-03 *Elementary French* — A continuation of 31-02. Reading of simple French prose, with written and oral exercises based on the material read. French conversation is encouraged whenever feasible. Prep. 31-02; 3 Class Hrs.; 3 Credit Hrs.

31-04 *Elementary French* — A continuation of 31-03. Reading of French prose of moderate difficulty, with practice in conversation. Prep. 31-03; 3 Class Hrs.; 1½ Credit Hrs.

31-15 *Intermediate French* — Introduction to the history of French civilization through texts of average difficulty, with some attention given to review of grammar, and to written and oral exercises. Prep. 31-04; 4 Class Hrs.; 4 Credit Hrs.

31-16 *Intermediate French* — A continuation of 31-15. Intensive reading of modern prose, with emphasis on the acquisition of a reading knowledge. Some conversational practice is included. Prep. 31-15; 4 Class Hrs.; 4 Credit Hrs.

31-17 *French Composition and Conversation* — Although some grammar review and written work is required, this course aims primarily to develop the ability to engage in French conversation. Prep. 31-16; 2 Class Hrs.; 2 Credit Hrs.

31-18 *French Composition and Conversation* — A continuation of 31-17, with emphasis on free composition, both written and oral. Oral reports serve as bases for class discussions. Prep. 31-17; 2 Class Hrs.; 2 Credit Hrs.

31-19 *Readings from Contemporary French* — In this course selected passages are read from the narrative and dramatic prose of the last fifty years. Among the writers included are Colette, Duhamel, Renard, Rolland, Vildrac, Anatole France, Gide, Proust, Romains and Sartre. Prep. 31-16; 5 Class Hrs.; 2½ Credit Hrs.

31-21 *French Literature from 1850 to 1900* — A study of the novel, especially of Flaubert, Zola, Daudet, Loti and Huysmans. Selections are read also from Sainte-Beuve, Taine and Renan. Lectures, collateral reading and reports. Prep. 31-16; 4 Class Hrs.; 4 Credit Hrs.

31-22 *French Literature from 1850 to 1900* — A continuation of 31-21. A study of the lyric poetry of the Parnassian and Symbolist schools, with selections from Gautier, Banville, Leconte de Lisle, Hérédia, Sully-Prudhomme, Baudelaire, Verlaine, Mallarmé and Rimbeau. Plays of the period are assigned for outside reading. Lectures and reports. Prep. 31-16; 4 Class Hrs.; 4 Credit Hrs.

31-23 *French Classicism* — A study of the background and non-dramatic litera-ture of the seventeenth century. The selections read are mainly from Malherbe, Descartes, Pascal, La Fontaine, Mme. de Sévigné, Mme. de La Fayette, Bossuet, and Fenelon. Lectures, collateral reading and reports. Prep. 31-16; 4 Class Hrs.; 4 Credit Hrs.

31-24 *French Classicism* — A continuation of 31-23. After an examination of the dramatic theories as expounded especially by Boileau, this course is devoted to the study of the plays of Corneille, Molière, and Racine. Lectures, collateral reading. Prep. 31-16; 4 Class Hrs.; 4 Credit Hrs.

31-25 *French Romanticism* — A study of the origins and development of the Romantic movement in France. Selected poems by Lamartine, Hugo, Musset and Vigny are read and discussed in class, while characteristic Romantic prose is assigned for outside reading. Lectures and reports. Prep. 31-16; 4 Class Hrs.; 4 Credit Hrs.

31-26 *French Romanticism* — A continuation of 31-25. After an examination of the dramatic theories expounded in the *Preface de Cromwell*, this course is devoted to the study of Romantic dramas. Lectures, collateral reading and reports. Prep. 31-16; 4 Class Hrs.; 4 Credit Hrs.

German

32-01 *Elementary German* — A beginner's course stressing the essentials of grammar, practice in pronunciation, and the acquisition of a basic vocabulary and idiomatic expressions. 3 Class Hrs.; 3 Credit Hrs.

32-02 *Elementary German* — A continuation of 32-01, with emphasis on the more difficult points of grammar, particularly the uses of the subjunctive mood. Prep. 32-01; 3 Class Hrs.; 3 Credit Hrs.

32-03 *Elementary German* — A continuation of 32-02. Reading of simple German prose, with oral and written exercises based on the material read. German conversation is encouraged whenever feasible. Prep. 32-02; 3 Class Hrs.; 3 Credit Hrs.

32-04 *Elementary German* — A continuation of 32-03. Reading of German prose of moderate difficulty, with practice in conversation. Prep. 32-03; 3 Class Hrs.; 1½ Credit Hrs.

32-15 *Intermediate German* — Introduction to the history of German civilization through texts of average difficulty with some attention given to review of grammar and to written and oral exercises. Prep. 32-04; 4 Class Hrs.; 4 Credit Hrs.

32-16 *Intermediate German* — A continuation of 32-15. Intensive reading of modern prose, with emphasis on the acquisition of a reading knowledge. Some conversational practice is included. Prep. 32-15; 4 Class Hrs.; 4 Credit Hrs.

32-17 *German Composition and Conversation* — Although some grammar review and written work is required, this course aims primarily to develop the ability to engage in German conversation. Prep. 32-16; 2 Class Hrs.; 2 Credit Hrs.

32-18 *German Composition and Conversation* — A continuation of 32-17, with emphasis on free composition, both written and oral. Oral reports serve as bases for class discussions. Prep. 32-17; 2 Class Hrs.; 2 Credit Hrs.

32-19 *Scientific German* — The purpose of this course is to provide students with a reading knowledge of scientific German. Articles dealing with chemistry, physics, mathematics and biology are read. Prep. 32-16; 5 Class Hrs.; 2½ Credit Hrs.

32-21 *Modern German Literature* — A survey of the main currents of German literature since 1880. The course deals chiefly with the novel and short story of the leading authors of the period. Lectures, collateral reading and reports. Prep. 32-16; 4 Class Hrs.; 4 Credit Hrs.

32-22 *Modern German Literature* — A continuation of 32-21, with the main emphasis on the drama and poetry. Representative selections from the Naturalistic, Impressionistic, and Expressionistic movements are read. Lectures, collateral reading and reports. Prep. 32-16; 4 Class Hrs.; 4 Credit Hrs.

32-23 *The Classical Period of German Literature* — This course traces the development of German literature during the second half of the eighteenth century,

dealing especially with the works of Lessing and Schiller. The Storm and Stress period also receives attention. Lectures, collateral reading and reports. Prep. 32-16; 4 Class Hrs.; 4 Credit Hrs.

32-24 *The Classical Period of German Literature* — A continuation of 32-23, this course is devoted to the life and works of Goethe, with emphasis on his lyric and dramatic poetry. Lectures, collateral reading and reports. Prep. 32-16; 4 Class Hrs.; 4 Credit Hrs.

32-25 *German Literature of the Nineteenth Century* — This course traces the chief tendencies in German literature from the beginning of Romanticism to the coming of Naturalism. Representative prose works of the principal writers of the period are read. Lectures, collateral reading and reports. Prep. 32-16; 4 Class Hrs.; 4 Credit Hrs.

32-26 *German Literature of the Nineteenth Century* — A continuation of 32-25, stressing the drama and poetry of the period. The selections read are mainly from Kleist, Hölderlin, Eichendorff, Novalis, Heine, and Hebbel. Lectures, collateral reading and reports. Prep. 32-16; 4 Class Hrs.; 4 Credit Hrs.

Spanish

33-01 *Elementary Spanish* — A beginner's course stressing the essentials of grammar, practice in pronunciation and progressive acquisition of basic vocabulary and idiomatic expressions. 3 Class Hrs.; 3 Credit Hrs.

33-02 *Elementary Spanish* — A continuation of 33-01, with emphasis on the more difficult points of grammar, particularly the uses of the subjunctive mood. Prep. 33-01; 3 Class Hrs.; 3 Credit Hrs.

33-03 *Elementary Spanish* — A continuation of 33-02. Reading of simple Spanish prose, with written and oral exercises based on the material read. Spanish conversation is encouraged whenever feasible. Prep. 33-02; 3 Class Hrs.; 3 Credit Hrs.

33-04 *Elementary Spanish* — Reading of Spanish prose of moderate difficulty, with practice in conversation. Prep. 33-03; 3 Class Hrs.; 1½ Credit Hrs.

33-15 *Intermediate Spanish* — Introduction to the history of Spanish civilization through texts of average difficulty, with some attention given to review of grammar and to written and oral exercises. Prep. 33-04; 4 Class Hrs.; 4 Credit Hrs.

33-16 *Intermediate Spanish* — A continuation of 33-15. Intensive reading of modern prose, with emphasis on the acquisition of a reading knowledge. Some conversational practice is included. Prep. 33-15; 4 Class Hrs.; 4 Credit Hrs.

33-17 *Spanish Composition and Conversation* — Although some grammar review and written work is required, this course aims primarily to develop the ability to engage in Spanish conversation. Prep. 33-16; 2 Class Hrs.; 2 Credit Hrs.

33-18 *Spanish Composition and Conversation* — A continuation of 33-17, with emphasis on free composition, both written and oral. Oral reports serve as bases for class discussions. Prep. 33-17; 2 Class Hrs.; 2 Credit Hrs.

33-19 *Readings from Contemporary Spanish* — In this course selected passages are read from the narrative and dramatic prose of the last fifty years. Among the writers included are Unamuno, "Azorín," Benavente, Ibáñez, Baroja, Balle-Inclán, Ayala, and Ortega y Hasset. Prep. 33-16; 5 Class Hrs.; 2½ Credit Hrs.

33-21 *Spanish Literature of the Golden Age* — This course deals with works of Cervantes, particularly the *Don Quixote* and the Novelas Ejemplares. Lectures, collateral reading and reports. Prep. 33-16; 4 Class Hrs.; 4 Credit Hrs.

33-22 *Spanish Literature of the Golden Age* — A continuation of 33-21, with emphasis on the drama of Lope de Vega, Tirso de Molina and Calderón. Lectures, collateral reading and reports. Prep. 33-16; 4 Class Hrs.; 4 Credit Hrs.

33-23 *Spanish Literature of the Nineteenth Century* — A study of the literature of Spain during the first half of the nineteenth century, with emphasis on the Romantic drama and poetry. Lectures, collateral reading and reports. Prep. 33-16; 4 Class Hrs.; 4 Credit Hrs.

33-24 *Spanish Literature of the Nineteenth Century* — A continuation of 32-23, this course is devoted to Spanish literature of the second half of the nineteenth century, particularly to the Realistic novel. Lectures, collateral reading and reports. Prep. 33-16; 4 Class Hrs.; 4 Credit Hrs.

33-25 *Spanish American Literature* — A survey of the general trends of Spanish American literature, with particular attention to the colonial period, the period of the struggle for independence, and the nineteenth century epic of the Gaucho and the Indian. Lectures, collateral reading and reports. Prep. 33-16; 4 Class Hrs.; 4 Credit Hrs.

33-26 *Spanish American Literature* — A continuation of 33-25, this course deals with the better known Spanish American writers of the Modernistic, Realistic and Contemporary periods, with emphasis on Rubén Darió and Gabriela Mistral. Lectures, collateral reading and reports. Prep. 33-16; 4 Ciass Hrs.; 4 Credit Hrs.

Accounting

41-01 *Principles of Accounting* — The purpose of this course is to offer training in the understanding of the principles and practice of elementary accounting. It is designed to serve the needs of those who intend to specialize in accounting as well as those who are studying it as a tool subject. The student is acquainted with the entire cycle of bookkeeping procedure: journalizing, posting, taking a trial balance, preparing working papers and statements, and closing the books, as well as the analysis of transactions. 4 Class Hrs.; 4 Credit Hrs.

41-02 *Principles of Accounting* — This course continues the work in 41-01 with a complete treatment of the analysis of transactions, after which attention is directed to the more formal forms of the recording process. The course takes up

the use of special journals and ledgers, controlling accounts, accrued and deferred items, valuation reserves for bad debts and depreciation, and the accounting for negotiable instruments. Prep. 41-01; 4 Class Hrs.; 4 Credit Hrs.

41-03 *Principles of Accounting* — This course continues the work of 41-02 with a discussion of the voucher system and matters related to payrolls. Then follows an introductory treatment of the accounting features peculiar to the individual proprietorship, the partnership and the corporation, with emphasis on the concept of net worth or capital. Prep. 41-02; 4 Class Hrs.; 4 Credit Hrs.

41-07 *Theory of Accounts* — This course introduces the fundamental accounting principles of the theory of debits and credits, journalizing and posting to accounts, and preparation of financial statements. The construction and interpretation of accounts is considered. 4 Class Hrs.; 4 Credit Hrs.

41-08 *Elements of Cost Accounting* — This course includes a specialized application of the fundamental accounting principles covered in 41-07 for the purpose of providing data for the management and administration of a business. Principles used in calculating and interpreting the cost of producing articles manufactured or of performing the services rendered are brought to the attention of the student. Prep. 41-07; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-09 *Elements of Cost Accounting* — This course is a continuation of 41-08. The basic principles of the cost of production having been introduced to the student through a study of job, process, and standard cost systems. 41-09 concerns distribution costs, namely, the outlays incurred in storing the finished product and shipping it or transporting it to the customers. Cost reports, summaries and control are considered. Prep. 41-08; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-10 *Principles of Accounting* — This course is offered to those students who are entering the College of Business Administration at the sophomore level. The purpose of the course is to present the fundamental principles of accounting theory and practice in sufficient detail and scope to provide adequate foundation for either advanced study in accounting or the accounting phases in the study of industrial relations, management and marketing. 10 Class Hrs.; 10 Credit Hrs.

41-25 *Principles of Accounting* — This course continues the development of the fundamental principles of accounting. It introduces the student to the accounting for bonds and manufacturing accounts, followed by an introductory discussion of some of the balance sheet items. A comprehensive review of elementary accounting principles and techniques is provided through the use of a practice set of a manufacturing corporation. Prep. 41-03; 4 Class Hrs.; 4 Credit Hrs.

41-26 *Intermediate Accounting* — This course is a continuation of 41-25 with emphasis shifting from the achievement of technical facility into the analytical, interpretive, and managerial aspects of accounting. Emphasis is placed on the logical development of accounting rules and principles from fundamental accounting theory. The course coverage includes a comprehensive discussion of the theory and the analysis of accounting statements, the analysis of working capital, profit and loss analysis, and miscellaneous ratios. Prep. 41-25; 4 Class Hrs.; 4 Credit Hrs.

41-27 *Accounting Statements* — This course is a survey of the basic accounting statements. The five areas that are covered are as follows: (1) an explanation of the form, content, and general principles governing the construction of financial statements; (2) a study of accounting valuation and income determination problems; (3) an extensive examination of working capital; (4) a detailed coverage of comparative statements including trend percentages and common-size statements; and, (5) a complete study of all the standard ratios followed by the methods and techniques of using them in analyzing and interpreting financial and operating data. Prep. 41-25; 4 Class Hrs.; 4 Credit Hrs.

41-31 *Cost Accounting* — Discussion of basis cost accounting terminology is followed by the job-order cost accounting cycle which shows the flow of costs through the general ledger and their presentation on financial statements. The following topics are then covered: the voucher system, special ledgers, materials inventory control, accounting for labor, and manufacturing expenses — actual and applied. 3 Class Hrs.; 3 Credit Hrs.

41-32 — *Cost Accounting* — This course continues the study of job-order cost accounting. The departmentalization of the factory is studied. This is followed by a review of the entire area of job-order cost accounting. A set is completed as part of the review.

The second part of the course is devoted to the area of process cost accounting and the costing of by-products and joint products. Emphasis is placed on the averaging method and first-in, first-out method of costing. These are the two methods of costing used in process cost accounting. 3 Class Hrs.; 3 Credit Hrs.

41-33 *Cost Accounting for Management* — Today, cost accounting, in addition to furnishing historical data, is an aid to management in cost control and cost analysis. In this course the student is mainly concerned with cost accounting as a tool of management. This course is designed to develop in the student the managerial ability to control production, operating, and distribution costs through use of cost accounting and the budget. Methods of costing and controlling materials, labor, and overhead are considered. Basic principles and cost analysis of the following fields are presented: job-order, process and standard cost. Prep. 41-22; 10 Class Hrs.; 5 Credit Hrs.

41-37 *Intermediate Accounting* — This course in Intermediate Accounting is designed to serve as a foundation for advanced accounting work. This calls for a broad and thorough understanding of basic accounting theory and its general application to business. The course begins with a series of studies describing in detail the accounting problems relating to valuation and presentation of corporate property, liability and equity items, as well as the related problems of measurement of cost and revenue. Prep. 41-26; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-38 *Intermediate Accounting* — This course is a continuation of 41-37. Here fundamental theory receives extended application. The purpose of this course is to broaden the base of the student's knowledge of subjects which are in a transitional and controversial stage. Both sides of controversial subjects are presented and frequent reference is made to the expressed opinions of the American Institute of Accountants, the American Accounting Association, and the

Securities and Exchange Commission. Prep. 41-37; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-42 *Budget Procedure* — The purpose of this course is to give consideration to the basic principles and procedures to be applied in preparing budgets. Among the various types of budgets developed are the sales, production, purchase, materials, labor, and expense. Prep. 41-33; 5 Class Hrs.; 2½ Credit Hrs.

41-43 *Auditing* — This is a course in auditing practice and procedure designed to give the student a practical knowledge of auditing. The course stresses the application of accounting and auditing principles in the verification, analysis and interpretation of the records and the compilation of reports by which management can base plans for future operations. Specifically, a large practice case is used to acquaint the student with actual audit work, work sheet preparation, and the preparation of the report. Prep. 41-36; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-44 *Auditing* — This course continues the work started in 41-43. The Accounting Research Bulletins and Statements on Auditing Procedure issued by the Committee on Accounting Procedure of the American Institute of Accountants are studied and discussed. The recommendations of the American Institute of Accountants, the American Accounting Association, the Federal Reserve Board, the Federal Trade Commission, the Securities and Exchange Commission, the New York Stock Exchange and business in general are recognized because of the marked influence of these agencies on accounting and auditing principles in the development of uniform auditing procedure. Prep. 41-43; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-45 *Advanced Accounting A* — This course is a continuation of 41-38. Here fundamental theory receives extended application to certain special areas of accounting. The topics covered are partnerships, consignments, venture accounts installment sales, and insurance. The analytical and interpretive aspects of accounting are stressed and developed. Prep. 41-38; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-46 *Advanced Accounting B* — The purpose of this course is to provide for the application of the knowledge of accounting principles and practices gained in the preceding courses to the analysis and solution of complex problems involving a recognition of the economic, legal and social aspects of various forms of business organizations. The course content consists chiefly of all phases of home and branch accounting, foreign exchange and consolidations. Prep. 41-38; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-47 *Advanced Accounting C* — This course is a continuation of 41-46. The course content consists chiefly of problems and discussion of principles. The remaining phases of consolidations and all phases of budgeting will be covered. Prep. 41-46; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-48 *Cost Accounting* — The estimated cost system is covered during the first part of the course. This is followed by an extensive study of budgetary procedures. The making of budgets for future revenues, costs, and products is one of the most important functions of the cost accountant. The flexible budget is also included in this area.

The last portion of the course covers the basic principles of standard cost accounting. 3 Class Hrs.; 3 Credit Hrs.

41-49 *Cost Accounting* — Standard cost accounting is continued in this course. The interdependence of budgeting and standard cost accounting is stressed. Problems using standard costs with flexible budgets are solved. A standard cost set is used to review the entire field of budgets and standards.

Cost accounting as a "tool of management" is studied. Topics included are cost control through cost reports, analysis and control of distribution costs, gross profit analysis, break-even analysis, profit-volume relationship, and differential cost analysis. 3 Class Hrs.; 3 Credit Hrs.

41-50 *Fiduciary Accounting* — This course is a continuation of 41-47. The entire field of insolvency and probate work is carefully studied. The topics covered are the statement of affairs, receiver's affairs, realization and liquidation report, and estates and trusts. Prep. 41-47; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

41-51 *System Building* — The purpose of this course is to provide for the application of the knowledge of accounting principles and practices gained in the preceding courses to the development and installation of a set of accounting records. The course content will be chiefly problems and cases. All phases of fund accounting and all principles of system work will be covered. Prep. 41-50; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

Industrial Relations

42-10 *Personnel* — The purpose of this course is to survey the work of the personnel department. The what and how of the employment office will be analyzed along with the current practices in the conduct of human relationships in industry. 3 Class Hrs.; 3 Credit Hrs.

42-17 *Problems in Personnel* — An examination of selected problems in industrial relations, with emphasis on government regulation in the fields of collective bargaining, wage policy, hiring practices, and union activities. The case method will be used to explore practical problems arising in the management of industry. Prep. 42-10; 3 Class Hrs.; 3 Credit Hrs.

42-44 *Wage Administration* — This course includes both practical and theoretical issues of wages and income; the economic and social function of wages, wage theories, wage practices of industrial management, collective bargaining of wage adjustments, fringe issues, legislative supplements, income security, and national wage policy. Prep. 20-26; 3 Class Hrs.; 3 Credit Hrs.

42-52 *Motion and Time Study* — This course is designed for students in Business Administration to show the proper use of work simplification and time study. The student is instructed in the use of process analysis, operation analysis, man-machine analysis, and micromotion analysis. This is accomplished through lectures, discussions and actual laboratory projects.

Time study is discussed and the student is instructed in the correct use of it and how this tool can be used as an aid to management. Prep. 45-34, 45-22; 2 Class Hrs.; 2 Lab. Hrs.; 3 Credit Hrs.

42-61 *Seminar in Collective Bargaining* — The meetings will be devoted to discussion of cases or reports on problems actually faced by industrial relations departments dealing with employees through collective bargaining. Broad issues of management authority, governmental regulation of labor-management relations, grievance procedures and arbitration will be analyzed. Research into more specific issues will be undertaken by students. Prep. 20-26; 4 Class Hrs.; 4 Credit Hrs.

42-62 *Seminar in Collective Bargaining* — This is a continuation of 42-61 — in which greater emphasis will be placed upon individual research and reports. Prep. 42-61; 5 Class Hrs.; 5 Credit Hrs.

Marketing and Advertising

43-08 *Sales Engineering* — The purpose of this course is to develop among industrial engineers a working and essential knowledge of the marketing function. By means of the seminar method the course deals with such fundamentals as classification of commodities, structure of markets, and functions of the promotional departments; contributions of research; problems of sales management. 3 Class Hrs.; 3 Credit Hrs.

43-21 *Principles of Marketing* — This course is designed to acquaint the student with the principles underlying the distribution of merchandise. Textbook assignments and lectures introduce a knowledge of the place of marketing in our modern economic order; the basic structure of markets; the main functions of marketing; the general classification of commodities into major types; the activities of several types of middlemen; the work of the commodity exchanges and cooperative marketing associations; and the development of chain stores, mail order houses, and department stores. 3 Class Hrs.; 3 Credit Hrs.

43-22 *Principles of Advertising* — The economic background of advertising and its development is presented, together with a survey of the methods for planning and preparing advertisements actually followed in the advertising offices. Consideration is given to human instincts, buying habits, argumentative and suggestive appeals, color, headlines, layout, illustrations, and trademarks. 3 Class Hrs.; 3 Credit Hrs.

43-30 *Salesmanship* — The objective of this course is twofold: (1) To provide the student who is interested in a career in marketing and advertising, but not necessarily in personal selling with a working and essential knowledge of sales functions and procedures and the role of the salesman in modern marketing process; (2) for those students interested in entering the field of personal selling as a career, a greater knowledge of modern selling techniques, including a thorough appreciation and understanding of the relation that exists between personal selling and the many marketing aids and techniques contained in a fully developed sales program. Prep. 43-21, 22; 3 Class Hrs.; 3 Credit Hrs.

43-31 *Copywriting* — Facility in dealing with effective advertising copy, whether from the point of view of creating it, selling it, or appraising it, is the aim of this course. Consideration is given to the relation of copy and headline to layout, the preparation of headlines and slogans and the principles of copy construction. Emphasis is placed upon analysis and preparation of the many types of copy

required for different purposes and different kinds of advertising media. Prep. 43-21, 22; 3 Class Hrs.; 3 Credit Hrs.

43-32 *Sales Management* — Training in the analysis of problems that arise in sales and marketing programs and in the exercise of personal judgment is emphasized through the use of actual case material. This first term of the course includes problems in adding or eliminating product lines; product design, trademark, guaranty and packaging problems; policies in selection of distribution channels; pricing, resale price maintenance, discounts; and sales planning. 3 Class Hrs.; 3 Credit Hrs.

43-33 *Sales Management* — Concluding the case work started in 43-32, careful attention is given in this second term of the course to the analysis and evaluation of problems in sales organization and control, sales methods and campaigns; and the control of sales operations. Fully as much as the course content, the case method used in these two courses serves as a useful bridge between preceding survey courses and the work required in the more advanced problem and seminar courses. 3 Class Hrs.; 3 Credit Hrs.

43-40 *Advertising Production* — Familiarity with mechanical problems and processes in advertising, including some knowledge of production techniques in television and radio, is the objective of this basic course. Major attention is given to printed advertising — publication, letters, folders, booklets. Elements of the course are: Visualizing the advertising idea; preparing the layout, including lettering and rough sketching; selecting the illustration; the use of color; photo-engraving and other illustrative processes; selection of type; determination of space requirements; printing and paper; and the working out of individual advertising projects. Prep. 43-22; 4 Class Hrs.; 3 Credit Hrs.

43-43 *Marketing Research* — The scope and uses of market research and analysis, together with their basis in scientific method, are considered at some length to reveal specific practical applications of this modern marketing tool to business needs. Quantitative and qualitative sales analysis, market trends, advertising research, product analysis, territory and sales quota determination are considered fully and related to basic methods of measuring the effectiveness of the marketing-advertising operation. Prep. 43-32; 4 Class Hrs.; 4 Credit Hrs.

43-44 *Foreign Marketing* — The purpose of this course is to give the student of marketing a knowledge of the problems, policies, and techniques essential to effective sales in foreign markets. Throughout the course emphasis is placed upon the differences in the nature of the problems encountered and the practices followed in this highly specialized field. Prep. 43-32; 2 Class Hrs.; 2 Credit Hrs.

43-46 *Credits and Collections* — This course is designed to acquaint the student with modern methods of credit investigation, determination, and collections. Consideration will be given to credit instruments, mercantile credit practices and policies, mercantile and special agencies, problems and policies in retail credit, and legal right in collecting. Prep. 43-22; 3 Class Hrs.; 3 Credit Hrs.

43-52 *Retail Merchandising* — The purpose of this course is to study the principles of successful retailing and to acquaint the student with the more modern methods of operating a retail organization. The course opens with a review and a more detailed discussion of markups, markdowns, and markons. Consideration

is then given to the operating statement as it applies to the retailer, the buying function, pricing of merchandise and the development of price lines, the control of inventory, stock turnover, the selection and management of retail sales personnel, and budgeting. Throughout the course merchandise planning is discussed and illustrated. Prep. 43-33 or 45-52; 4 Class Hrs.; 4 Credit Hrs.

43-53 *Problems in Advertising* — Using actual case materials, this course comprehends a wide variety of basic promotional problems in representative industries and firms. Careful attention is given to analysis and solution of divergent problems involving the profitable use of advertising in relation to the marketing strategy as a whole. The cases illustrate significant differences in buying habits and motives and afford opportunity to appraise a broad range of advertising and sales promotion programs precisely as they were evolved. Prep. 43-22, 43-32; 3 Class Hrs.; 3 Credit Hrs.

43-54 *Problems in Advertising* — Concluding the case work carried on in 43-53, this course seeks to develop a thorough understanding of the administrative aspects of advertising from both the advertiser's and the advertising agent's point of view and at the same time to develop a deeper comprehension of the economic effects of advertising. It intensifies previous study of some of the cases with particular respect to the media selection and the control and measurement of advertising effort. Taking a broad view on the basis of individual cases it also analyzes the influences of advertising and allied promotions upon our economy. Prep. 43-53; 4 Class Hrs.; 4 Credit Hrs.

43-61 *Seminar in Marketing and Advertising* — This seminar course, taken in the senior year, is designed to give students majoring in the field an opportunity to pursue further those specific aspects of marketing or advertising which are of particular interest to the student and in which he feels the need for additional information and training. Individual research and reports are the basis of the seminar meetings. 3 Class Hrs.; 3 Credit Hrs.

43-62 *Thesis in Marketing and Advertising* — The purpose of this optional seminar course is to give those students majoring in the field an opportunity to prepare a written thesis report on a topic selected by the student. In the seminar meetings, the selected topics, and individual research upon them, are the basis for discussion. 4 Class Hrs.; 4 Credit Hrs.

Finance and Insurance

44-13 *Construction Finance* — The financial problems confronting the setting up of engineering and construction organizations and the methods of providing funds to carry on projects constitute the subject matter to be studied. This will include a consideration of the various forms of business organization from the legal as well as the operational point of view. The uses of capital stock, mortgage bonds, land trust certificates, purchase money mortgages, together with the importance of appraisals in the financing of public projects, projects of private enterprise, public utilities, and expansion of these services are studied. The problems of providing working capital and the use of bank credit are also considered. 3 Class Hrs.; 3 Credit Hrs.

44-14 *Industrial Finance* — This course takes up the various problems encountered in the promotion of new businesses and the reorganization and management of old ones.

Emphasis is placed on problems encountered in administering the working capital and in raising fixed capital. Methods of measuring financial strength and the proper management of earnings are covered. Finally, ways and means of working with the courts in insolvency and bankruptcy are taken up with emphasis on ways to avoid financial difficulties. 3 Class Hrs.; 3 Credit Hrs.

44-20 *Introduction to Finance* — An introductory survey designed to acquaint the student with the role of finance in the economic world. The survey includes capital formation and uses, financial institutions and their functions, descriptive analysis of banks, investment companies, insurance companies and brokerage houses, farm credit organizations, and consumer credit agencies. 3 Class Hrs.; 3 Credit Hrs.

44-22 *Principles of Insurance* — The purpose of the course is to provide a comprehensive knowledge of insurance principles and coverage such as will provide a broad foundation for the student who plans to enter the business of insurance or enable the man or woman in business to plan a satisfactory program for personal needs or business responsibilities. Content: the basic principles of insurance, solving the economic problems of risk, types of insurance contracts, legal interpretation of the insurance contract, types of insurance, co-operative organizations in the field of insurance. 3 Class Hrs.; 3 Credit Hrs.

44-31 *Business Finance* — The fundamental principles of finance are approached from the point of view of the business man. Methods of organizing and financing new and old business ventures are integrated with present-day practice. Merits of partnerships and corporations from the standpoint of liability, risk and taxes are considered. Consideration is given to the various factors that influence capital structure and the services of the investment banker; the Securities Exchange Act and Blue Sky Laws; the liabilities and privileges of stockholders and directors. Prep. 44-20; 4 Class Hrs.; 4 Credit Hrs.

44-32 *Business Finance* — This course covers the financial aspects of sales, prices and markets; methods of raising short-term working capital and problems involved in keeping it revolving. The proper administration of income to meet the objectives of the company, and the part played by depreciation surplus and dividend policy are considered. Methods of evaluation as applied to various types of business from the standpoint of the buyer and seller. The course also includes principles to be applied in consolidating or merging companies or recapitalizing problems dealing with receivership and bankruptcy. Prep. 44-31; 4 Class Hrs.; 4 Credit Hrs.

44-33 *Life Insurance* — A study of life insurance and its place in planning an estate. A detailed study of policy provisions; how rates are made; measuring the net cost of insurance; present day reserve systems; how dividends are calculated; group and accident policies; investments of life insurance companies; and legal aspects of life insurance. Prep. 44-22; 3 Class Hrs.; 3 Credit Hrs.

44-34 *Property Insurance* — A detailed study of the fire insurance contract with special reference to restricting clauses; warranties, waiver and added forms and

clauses; rate structure; underwriting problems; consequential losses and claim settlement; insurance of goods in transit; kinds of policies; coverage and rate making. Prep. 44-33; 3 Class Hrs.; 3 Credit Hrs.

44-41 *Investments* — This course is concerned with investment analysis. It covers methods of analyzing the industry, the particular company in the industry, and the specific securities of the company. Factors that enter into the rating of stocks and bonds, such as number of times interest earned, capital structure and asset value are taken up in order. Also included is a study of protective covenants and remedies of junior and senior security holders. Prep. 44-32; 3 Class Hrs.; 3 Credit Hrs.

44-42 *Investments* — This course is concerned with the problems of managing investment funds. Through the study of case material and readings, principles are developed for analyzing the particular investment needs of an individual or institution. Then comes the selection of securities to fit the need. The advantage and disadvantage of stocks and bonds and all types of investments are related to fluctuations in the business cycle and money market conditions. Prep. 44-41; 3 Class Hrs.; 3 Credit Hrs.

44-43 *Mathematics of Finance* — This course covers the basic mathematics essential to an understanding of financial computations, including the fundamental operations in algebra, simple equations, ratios and proportions, and logarithms, together with their application to problems in simple interest, discounts and partial payment. 3 Class Hrs.; 3 Credit Hrs.

44-44 *Mathematics of Finance* — A continuation of 44-43. This course will cover compound interest, annuities, amortization and sinking funds, bond valuation, depreciation and life insurance. Prep. 44-43; 3 Class Hrs.; 3 Credit Hrs.

44-51 *Trust Management* — This course deals with the creation of personal and corporate trusts, functions of the trust officer, legal rights and duties of the parties, problems of Lifeman and Remainderman, government supervision, and investment problems. Prep. 44-42; 3 Class Hrs.; 3 Credit Hrs.

44-52 *Security Markets* — This is a study of our security markets, how securities are bought and sold, the future market, the brokerage house, government regulation, and the problems of pricing. Prep. 44-42; 4 Class Hrs.; 4 Credit Hrs.

44-61 *Seminar in Finance and Insurance* — This senior course is intended to give students majoring in the field of finance and insurance an opportunity to pursue research work in the specific aspects of this field. Each student selects a topic in which he has a particular interest and where he feels the need of additional information. Oral reports, group discussion. Prep. 44-42; 3 Class Hrs.; 3 Credit Hrs.

44-62 *Seminar in Finance and Insurance* — This course gives the student the opportunity to continue the individual research and group discussions which began in 44-61. Prep. 44-61; 4 Class Hrs.; 4 Credit Hrs.

Business Management

45-21 *Principles of Business Management* — This course is intended to present the basic principles which are involved in the several areas of management activity. It is designed as a first approach for students into the policies and problems encountered in business. The study revolves about the initiation and operation of business from the viewpoint of financing the organization of personnel, the use of physical facilities and the operating features of a going concern as they pertain to the use of men, machines, and money. 3 Class Hrs.; 3 Credit Hrs.

45-22 *Principles of Business Management* — A continuation of 45-21 in which emphasis is placed upon personnel evaluation, rating, and methods of payment, the control of production and the relation of costing and sales procedures to the efficiency and management of the enterprise. Prep. 45-21; 3 Class Hrs.; 3 Credit Hrs.

45-33 *Management Problems — Personnel* — This course will analyze the development of personnel policy and personnel administration as a tool of management. Timely, significant manpower problems in industry and case studies are used to develop subject matter in this field. Topics covered include the nature and scope of personnel administration, analyzing personnel problems, wages and work assignments. Prep. 45-22; 3 Class Hrs.; 3 Credit Hrs.

45-34 *Management Problems — Production* — This course will analyze management problems in the area of production. Case studies are used as a basis for discussing problems of plant and equipment, materials and purchasing, control of production and cost control. Prep. 45-22; 3 Class Hrs.; 3 Credit Hrs.

45-45 *Transportation Practices* — This course is designed to bring out the important position of transportation in the economic development of the nation. One major aspect of the course is a broad, comparative evaluation of the various available transportation services as measured by the yardsticks of cost, time in transit, reliability and geographical coverage. Consideration is given to rail, motor, water, air, freight forwarder, express and parcel post movement of freight. Attention is given to the importance to industrial management of freight classification and freight rates.

The second major aspect of the course consists of the nature and characteristics of motor transportation as an industrial activity. Particular attention is given to specific problems of the New England economy and the extent of its dependence upon motor transportation service. Prep. 45-33; 4 Class Hrs.; 4 Credit Hrs.

45-46 *Traffic Management* — This course stresses the application of standard transportation practices as a means of more effective industrial management. Particular attention is given to the analysis and control of the direct cost of incoming and outgoing freight as a valid and substantial part of the total cost of production. Indirect costs resulting from freight claims and less effective methods of transportation are analyzed and clarified. Progressive distribution concepts including the use of commercial warehousing, pool car and pool truck shipments and other methods of consolidation are explained. A major portion of the course is devoted to the explanation of traffic management problems

arising in motor transportation and from the use of motor transportation, with specific stress on the solution of these problems as they affect New England industrial activity.   Prep. 45-33; 4 Class Hrs.; 4 Credit Hrs.

45-50 *Production Control* — This course is designed to acquaint the student with the problems and procedures involved in planning for production and overseeing production once started.   Specifically, this course covers the areas of organizing for production, setting up work areas and standards, storekeeping, scheduling, routing, and dispatching.   Plant layout and material handling are considered as they apply to the control of production. Prep. 45-34; 4 Class Hrs.; 4 Credit Hrs.

45-51 *Office Management* — This is an application of the principles of management to the specialized problems of many different kinds of offices.   Prep. 45-34; 3 Class Hrs.; 3 Credit Hrs.

45-52 *Management of Sales* — This seminar course, taken in the first term of the Senior year, is intended to give students majoring in Business Management an opportunity to examine the organization and the operation of the firm's sales department.   Emphasis is placed upon management's interest in effective marketing and the co-ordination of sales with other operations and department of the firm.   Prep. 45-34; 2 Class Hrs.; 2 Credit Hrs.

Business Law

46-03 *Contracts and Agency* — This course is designed to give a fundamental knowledge of basic legal principles to the engineering student through the study of the origin and development of law; the elements of contract, the agency relationship and its operation; the law of workmen's liens and the origin and expansion of the law in workmen's compensation.   6 Class Hrs.; 3 Credit Hrs.

46-41 *Legal Aspects of Business I* — Through the use of text and case materials, the basic business law principles involved in contracts, sales, credit instruments and creditors' rights are examined.   4 Class Hrs.; 4 Credit Hrs.

46-42 *Legal Aspects of Business II* — This course is a continuation of the above, and it concerns itself with a study of the legal aspects of the various forms of business organization, including agency, partnership, and corporation, through which contracts are made.   4 Class Hrs., 4 Credit Hrs.

46-53 *Income Tax Law* — A comprehensive study of the Internal Revenue Code and Treasury Regulations is undertaken in connection with the preparation of income tax sections for individuals and partnerships. Payroll tax accounting is reviewed.   3 Class Hrs.; 3 Credit Hrs.

46-54 *Income Tax Law* — This course is a continuation of 46-53.   The preparation of returns for corporations and estates and trusts is emphasized. Research problems are assigned to the students in order to acquaint them with the working tools of tax practice — the complete Federal Tax Library. Prep. 46-53; 3 Class Hrs.; 3 Credit Hrs.

46-55 *Labor Law* — This course studies the historical development of legal principles as applied to labor relations by the courts since 1800. Labor decisions

under the Sherman Act are discussed as well as the modifications set forth by 20th century labor legislation.   Prep. 20-26; 3 Class Hrs.; 3 Credit Hrs.

46-56 *Law of Merchandising* — A study of the legal problems which arise in connection with the marketing of merchandise including legal problems involved in advertising, price-fixing, anti-trust laws, and unfair sales. Prep. 46-42; 4 Class Hrs.; 4 Credit Hrs.

46-57 *Law of Corporate Finance and Insurance* — This course includes a study of the legal responsibilities of public accountants for audit certificates, legal incidents in corporate finance, including federal and state regulation of securities, and current problems, principles, and concepts of insurance law. Prep. 46-42; 4 Class Hrs.; 4 Credit Hrs.

Secretarial Studies

47-01 *Typing I* — This course provides basic training in typewriting with emphasis on a complete mastery of the keyboard and the development of speed and accuracy. Instruction is given in centering, tabulation, and elementary business letters. 3 Class Hrs.; 5 Lab. Hrs.; 3 Credit Hrs.

47-02 *Typing II* — This course continues the work begun in 47-01 with a reconstruction of basic skills and further development of speed and accuracy. Business letters are studied in greater detail; and more difficult arranging problems are worked out. 3 Class Hrs.; 5 Lab. Hrs.; 3 Credit Hrs.

47-03 *Typing III* — The student's goal in this course is the attainment of a high degree of proficiency to enable him to enter office employment as a competent typist. The emphasis is on office standards of speed, accuracy, and arrangement. 3 Class Hrs.; 5 Lab. Hrs.; 3 Credit Hrs.

*47-04 *Typing IV* — This is a finishing course in typing. Advanced problems in planning and arranging letters, reports, and tabulations are worked out. Attention is given to the preparation of theses and other college papers. 3 Class Hrs.; 5 Lab. Hrs.; 1½ Credit Hrs.

47-11 *Typing A* — This course provides a thorough foundation in typewriting. Emphasis is placed on a mastery of the keyboard and development of speed and accuracy. Instruction is given in business letters, addressing envelopes, tabulation, and centering. 4 Class Hrs.; 6 Lab. Hrs.; 4 Credit Hrs.

47-12 *Typing B* — This course continues the work in 47-11 with a reconstruction of basic skills and further development of speed and accuracy. Advanced problems in planning and arranging business letters and tabulations are worked out. Instruction is given in the typing of manuscripts and business forms. Prep. 47-11; 4 Class Hrs.; 6 Lab. Hrs.; 4 Credit Hrs.

47-13 *Beginning Shorthand* — The aim of this course is mastery of the principles of Gregg Simplified Shorthand. 4 Class Hrs.; 4 Credit Hrs.

*Five-week term course.

47-14 *Intermediate Shorthand* — This course provides a transition from the theory learned in 47-13 to the practical work of taking dictation. Speed is developed through a constant review of the principles and brief forms of Gregg Simplified Shorthand and by the acquisition of a working business vocabulary. 4 Class Hrs.; 4 Credit Hrs.

47-21 *Transcription I* — Development of shorthand speed is continued in this course until the student acquires a speed sufficient for ordinary office dictation. Transcription training is introduced with emphasis on the mailability of transcribed letters. Prep. 8 credits in typing and 8 credits in shorthand; 4 Class Hrs.; 4 Credit Hrs.

47-22 *Transcription II* — The transcription training begun in 47-21 is continued in this course with emphasis on the improvement of shorthand, typing, and English skills. The objective of the course is a marketable skill enabling the student to compete for stenographic employment. 4 Class Hrs.; 4 Credit Hrs.

Professional Development

50-01 *Professional Development* — An over-all discussion of job-getting techniques covering in order such items as a survey of the occupational field wherein the engineering training can be profitably applied, a market survey of opportunities, a study of the accepted techniques related to job-getting efforts, such as qualification records, prospect files, letter writing, interviews, etc., planning and executing the job-getting campaign.

Concurrently and co-ordinated with the foregoing, the purposes, objectives, and activities of the professional societies and of the Engineers' Council for Professional Development will be developed with specific reference to the ethics of the profession, the licensing of engineers, and after-college continuation of educational progress. 3 Class Hrs.; 3 Credit Hrs.

Department of Military Science

Purposes and Requirements of the R.O.T.C. Program

The general object of the Reserve Officers' Training Corps is to qualify students for positions of leadership in time of national emergency, and to provide junior officers for the Officers' Reserve Corps (ORC), the National Guard, and the Regular Army. The program consists of two parts, the Basic Course (180 hours) and the Advanced Course (300 hours). Signal Corps and Engineer Corps Branches of the R.O.T.C. are maintained at Northeastern University.

Basic Course: All applicants at the time of enrollment must be (1) physically qualified under standards prescribed by the Department of the Army; (2) not less than 14 years of age and under 23 years at time of enrollment; (3) regularly enrolled students in the Day Colleges of Northeastern University.

Advanced Course: All applicants at the time of admission to this course must (1) be under 27 years of age; (2) have completed the Basic Course or received equivalent credit for previous military training; (3) have been selected by the College Administration and the Professor of Military Science and Tactics (PMS&T); (4) execute a written agreement with the government to complete the Advanced Course including attendance at one R.O.T.C. Summer Camp as speci- fied below. Formally enrolled students of the Advanced Course will be paid a monetary allowance monthly in lieu of subsistence at a daily rate specified by the Department of the Army for a total period not in excess of 595 days. (Current rate $27.00 per month.) A $100.00 uniform allowance is authorized for each cadet enrolled in the Advanced Program. Students who successfully complete the Advanced Course will be commissioned as Second Lieutenants in the Reserve Corps or in the Regular Army.

Previous Training: Students who have had previous honorable active service in the Army, Navy, Air Force, Marine Corps, or Coast Guard may receive credit toward completion of the two years of the Basic Course, subject to approval of the Professor of Military Science and Tactics, as follows: (1) twelve months or more, credit not to exceed the entire Basic Course; (2) six months or more, credit not to exceed the first year of Basic Course; (3) less than 6 months, no credit.

For previous training in a junior division (high school) R.O.T.C. Unit, credit will be determined by the Professor of Military Science and Tactics. Normally credit for the first year Basic Course will be granted for three years of junior R.O.T.C. training.

Summer Camp: Attendance at one advanced course camp is required of all students enrolled in the Advanced Course. The camp period of six weeks is normally conducted during June and July. R.O.T.C. students who are enrolled on full-time programs will take their six weeks' summer camp between their junior and senior year. Co-operative students will be deferred until after the completion of their senior year and will take the six weeks' summer camp immediately thereafter. Transportation to and from camp is furnished by the government. While at camp, students do not receive the monetary allowance in lieu of subsistence but are paid at the rate of $78.00 per month. The Engineer Corps Camp is normally held at Fort Belvoir, Virginia. The Signal Corps Camp is normally held at Camp Gordon, Georgia.

Deferment: Although enrollment in R.O.T.C. does not of itself exempt or defer a student from induction, many such students are deferred under quotas pre- scribed by the Secretary of Defense in order that they may complete both their academic curricula and their military training. Assignment of deferred status within the quota allotted to Northeastern will be a function of the PMS&T. Once granted, a deferment is valid until completion of his course of study if the student is continuously enrolled in the University and remains in good standing in the Department of Military Science.

Deferments are granted to students enrolled in the Basic as well as to those in the Advanced Course. Recent experience indicates that most of the R.O.T.C. students who give promise of becoming capable officers are deferred until com- pletion of their work for the baccalaureate degree.

General Index

APPLICATION FOR ADMISSION

NORTHEASTERN UNIVERSITY   *Department of Admissions*

360 HUNTINGTON AVENUE, BOSTON 15, MASS.

OFFICE HOURS, DEPARTMENT OF ADMISSIONS, 9.00 A.M. TO 5 P.M. DAILY AND 9.00 A.M. TO 12.00 NOON ON SATURDAY.

(A nonreturnable fee of ten dollars must accompany this application. Make checks, money orders, or drafts payable to Northeastern University)

All Applicants, including Veterans, should fill out the following form with care.

I Mr.
  Miss...

     Print   *First*   *Middle*   *Last Name*

hereby apply for admission to the College of..

for the school year beginning..

I expect to major in.. *Veteran*..............................

                                                               Yes or No

Address..

Date of Birth....................................*Age*..............*Tel.*..............................

Are you a citizen of the United States?..

Graduate of.................................... *High School, Year*..............................

Location of High School..

Name of Principal..

Name and address of other high schools you have attended..............................

....

....

....

If not a graduate, state the years of attendance and why you left....................

....

Father's, mother's, or guardian's name and address......................................

....

....

Have you any Physical infirmities, Defects of speech, Defects of hearing, Bodily infirmities. Explain, if any..

....

....

(OVER)

Have you done collegiate work elsewhere?.................... ....

If so, name and address of college or university........ ... .

....

....

Applicant must request the college or university which he has attended to send official transcripts of his records direct to the Director of Admissions, Northeastern University.

Do you expect advanced credit for past collegiate work?....................................

The signature of the Parent or Guardian is required in all cases wherein the applicant is under the age of 21 years.

This application has been read by me and has my approval.

....

Signature of Parent or Guardian

This section must be filled in by Veterans expecting to receive VA benefits. Each Veteran must list below all High or Preparatory Schools, all Technical or Trade Schools, all Colleges (Undergraduate), all Colleges (Graduate), and all Service Schools, which he has attended; together with the curriculum taken in each, the dates of attendance in each, and the Degrees, Diplomas, Certificates, or credit received in each.

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I hereby certify that the above information is correct.

....

Signature of Veteran

NORTHEASTERN UNIVERSITY

(COEDUCATIONAL)

*COLLEGE OF LIBERAL ARTS

Offers a broad program of subjects serving as a foundation for the understanding of modern culture, social relations, and technical achievement. Varied opportunities are available for vocational specialization. Degree: Bachelor of Science or Bachelor of Arts.

*COLLEGE OF ENGINEERING

Offers curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. Classroom study is supplemented by experiment and research in well-equipped laboratories. Degree: Bachelor of Science in the professional field of specialization.

The College of Engineering also offers during evening hours graduate programs of instruction leading to the degree of Master of Science in certain fields of civil, mechanical, and electrical engineering, chemistry, and mathematics-physics.

*COLLEGE OF BUSINESS ADMINISTRATION

Offers curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management. Each curriculum represents in itself a broad survey of business technique, differing from the others chiefly in emphasis. Degree: Bachelor of Science in Business Administration.

COLLEGE OF EDUCATION

Offers four-year curricula for the preparation of elementary and secondary school teachers and leading to the degree of Bachelor of Science in Education. Graduate courses leading to the degree of Master of Education are offered during evening and Saturday morning hours.

SCHOOL OF BUSINESS

Offers curricula through evening classes in Accounting, Management, Marketing, Law Business, Engineering and Management, and Public Administration. Conducts certificate programs in Labor Relations, Retailing, Real Estate, Office Management, Insurance, Transportation and Traffic Management, Credit and Financial Management, Municipal Management, Production Management, Quality Control, World Trade, and for Business and Professional Secretaries. Arranges intensive programs of one or more courses to serve special needs. Degree: Bachelor of Business Administration with appropriate specification.

The Graduate Division of the School of Business provides an evening program of graduate study leading to the degree of Master of Business Administration.

EVENING DIVISION OF THE COLLEGE OF LIBERAL ARTS

Offers courses in the fields of Economics, English, History, Government, Philosophy, Psychology, and Sociology; the program is equivalent in hours to one-half the requirements for the bachelor's degree. Special courses may be arranged. Degrees: Associate in Arts and Associate in Social Sciences.

*The Co-operative Plan

The Colleges of Liberal Arts, Engineering, and Business Administration offer day programs and are conducted on the Co-operative Plan. After the freshman year students alternate periods of study with periods of work in the employ of business or industrial concerns. Under this plan they gain valuable experience and earn a large part of their college expenses. Full-time curricula are available for preprofessional students who do not desire the Co-operative Plan.

For further information regarding any of the above schools, address

NORTHEASTERN UNIVERSITY

360 Huntington Avenue   Boston, Massachusetts

Telephone
COPLEY 7-6600

NORTHEASTERN UNIVERSITY

LVX
VERITAS
VIRTVS

OFFICE HOURS

June 15 — August 15

Monday through Thursday	8:45 a.m.–9:00 p.m.
Friday	8:45 a.m.–5:00 p.m.

August 15 — June 15

Monday through Friday	8:45 a.m.–9:00 p.m.
Saturday	8:45 a.m.–12:00 noon

The office is closed on all legal holidays.

Interviews

Prospective students, or those desiring advice or guidance regarding any part of the school work or curricula, are encouraged to arrange for personal interviews with the Dean or other officers of instruction. Career planning through competent guidance provides an understanding of professional requirements and develops that definiteness of purpose so vital to success.

Gifts and Bequests

Northeastern University will welcome gifts and bequests for the following purposes:

(a) For its building program.
(b) For general endowment.
(c) For specific purposes which may especially appeal to the donor.

It is suggested that, when possible, those contemplating gifts or bequests confer with the President of the University regarding the University's needs before legal papers are drawn.

The legal name of the University is "Northeastern University." However, in the making of gifts and bequests to Northeastern, the following wording is suggested: "Northeastern University, an educational institution incorporated under the laws of Massachusetts and located in Boston, Massachusetts."

Address Communications to

NORTHEASTERN UNIVERSITY
SCHOOL OF BUSINESS

360 HUNTINGTON AVENUE, BOSTON 15, MASS.

Telephone: COpley 7-6600

NORTHEASTERN UNIVERSITY
EVENING DIVISION
SCHOOL OF BUSINESS

COEDUCATIONAL

A DISTINCTIVE SCHOOL OF BUSINESS

*providing opportunities for men and women to receive advanced training
in Business during convenient Evening Hours*

Calendar

1954

Summer session classes begin	June	1
Commencement	June	27
Legal Holiday — No class sessions	July	4
Summer Session classes end	September	2
Fall semester classes begin	September	20
Legal Holiday — No class sessions	October	12
Week for first term tests	October	25–30
Legal Holiday — No class sessions	November	11
Legal Holiday — No class sessions	November	25
Week for second term tests	December	7–12
Final class session before Christmas recess	December	21

1955

First class session after Christmas recess	January	3
Final examinations, fall semester	January	24–29
Spring semester classes begin	January	31
Legal Holiday — no class sessions	February	22
Week of first term tests	March	7–12
Legal Holiday — No class sessions	April	19
Week of second term tests	April	18–23
Final examinations — spring semester	May	23–28
Summer session classes begin	May	31
Commencement	June	17
Summer session classes end	September	1

Table of Contents

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Northeastern University

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Northeastern University

General Statement

NORTHEASTERN UNIVERSITY is incorporated as a philanthropic institution under the General Laws of Massachusetts. The State Legislature, by special enactment, has given the University general degree granting powers.

The Corporation of Northeastern University consists of men who occupy responsible positions in business and the professions. This Corporation elects from its membership a Board of Trustees in whom the control of the institution is vested. The Board of Trustees has four standing committees: (a) An Executive Committee which has general supervision of the financial and educational policies of the University; (b) a Committee on Buildings which has general supervision over the building needs of the University; (c) a Committee on Funds and Investments which has the responsibility of administering the funds of the University; (d) a Committee on Development which is concerned with furthering the development plans of the University.

Founded in 1898, Northeastern University from its beginning has had as its dominant purpose the discovery of human and social needs and the meeting of these needs in distinctive and highly serviceable ways. While subscribing to the most progressive educational thought and practice, the University has not duplicated the programs of other institutions but has sought "to bring education more directly into the service of human needs."

The Northeastern Plan of Education is especially designed for students who must earn while they learn. Basically, this plan consists of two types of education:

(1) The Day Colleges are conducted upon the co-operative basis whereby upper-class students alternate regular periods of instruction at the University with similar periods under supervised employment upon a job with pay in business or industry. Approximately six hundred business and industrial concerns co-operate with Northeastern University in making this program effective.

(2) The Evening Division offers curricula for students who hold regular jobs in the day and attend classes in the evening hours.

The following is a brief outline of the principal types of educational opportunities offered:

In the Field of Liberal Arts —

The College of Liberal Arts offers majors in the usual fields of the arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. With the exception of pre-professional programs, all day curricula are five years in length and operated on the Co-operative Plan.

The Evening Division of the College offers courses in the fields of arts and social sciences leading to the Associate in Arts and Bachelor of Arts degrees.

In the Field of Business —

The College of Business Administration offers five-year co-operative curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management leading to the degree of Bachelor of Science in Business Administration.

The School of Business — operated during evening hours — offers undergraduate curricula leading to the degree of Bachelor of Business Administration in Accounting, Business Management, Credit and Financial Management, Industrial Management, Insurance, Law and Business, Marketing, Office Management, Personnel and Industrial Relations, Production Management, Public Administration, Real Estate, Retailing, Traffic and Transportation, and Engineering and Management. Students desiring shorter programs concentrated in specific areas may enroll in one of the Institute programs provided in each of the areas mentioned above. The Institute for Business and Professional Secretaries is also offered as a special program for women.

The Graduate Division of the School of Business provides an evening program of graduate study leading to the degree of Master of Business Administration.

In the Field of Engineering —

The College of Engineering, one of the largest in the United States, offers five-year co-operative curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering leading to the degree of Bachelor of Science with specification according to the department in which the student qualifies.

The College of Engineering also offers during evening hours graduate programs of instruction leading to the degree of Master of Science in certain fields of Civil, Mechanical, and Electrical Engineering. These evening curricula are designed to be of service to young engineering graduates who are employed in the Greater Boston area.

The Lincoln Institute offers during evening hours college level programs leading to the degree of Associate in Engineering in Chemistry, Civil and Structural, Mechanical, Electrical, Electronic, and Industrial Engineering.

In the Field of Education —

The College of Education offers day curricula combining broad general education and professional study for the preparation of elementary and secondary school teachers. Degree: Bachelor of Science in Education.

The Graduate Division of the College offers, during late afternoon and Saturday morning hours, advanced courses leading to the degree of Master of Education.

Location of University Buildings

Northeastern University is located in Boston, a city which is rich in educational and cultural opportunities. The School of Business is in the University center on Huntington Avenue just beyond Massachusetts Avenue at the entrance to the Huntington Avenue Subway. The School is easily reached from the various railroad stations and from all points of the Metropolitan Transit Authority. Parking space is available for student parking.

School of Business

The Background of an Institution

FORTY-SEVEN YEARS ago, in March of 1907, the first undergraduate evening school of business in New England was organized. This was the beginning of Northeastern University School of Business, a pioneer endeavor to bridge an existing gap in business and professional education. Four years later, the School was authorized by the Massachusetts Legislature to grant university degrees to its graduates.

Administrative Policy

The School of Business was founded to serve those who have only evening hours free for study — a special field, limited to the education of the person who has permanently left day school and gone to work. The Northeastern University evening student is an adult, usually more mature than the student of a day school. He is in direct touch with business and is expected to take an active part in his own supervised training. The constant effort of the administrative and teaching staff is toward more effective means of suiting their educational service to the individual evening student.

Purpose

Now, just as at the start, the School seeks first to determine what business needs in its personnel, and then to supply properly trained men and women who can fulfill those needs.

The training of a student at Northeastern has always been conducted so that a graduate receives not only a B.B.A. degree, but an immediately applicable vocational training equipping him to fill a better position in some one business activity. For his future, he has the advantage of a thorough background of business methods and an appreciation of the problems of management, which, if properly used, may lead to advancement and executive responsibilities.

Staff of Instruction

The teaching staff of the School is recruited from business and professional leaders of New England business. The instructors are college-trained men who have proved their ability in their various fields of specialization. They are selected on the basis of their ability to convey knowledge to others in an interesting, inspiring, and effective manner. They are also chosen for the breadth of their training and experience.

Success of the Alumni

The best indication of the cumulative rewards to be won by pursuing a systematic program of study in spare evening hours is to be found in the records of Northeastern School of Business Alumni.

A study made just prior to the war covering all Boston graduates conclusively shows that better positions and increased incomes are directly traceable to the evening hours spent in preparation at Northeastern.

A portion of this study is the comparison of positions held by the alumni when they entered the School as freshmen with the positions they held at the time of the study.

ALUMNI POSITIONS

	Upon Entrance %	Date of Study %
Presidents and Other Corporation Officers	0.0	3.8
Owners of Business	1.0	13.1
Treasurers and Comptrollers	0.3	7.7
Accountants	7.0	16.9
Office Managers	1.6	7.4
Department Managers	2.9	11.5
Salesmen	3.8	3.8
Educators	8.6	7.0
Government Employees	2.6	7.7
Bookkeepers	18.8	1.3
Clerks	34.2	6.4
Factory Workers	5.8	2.2
Unemployed	2.9	1.9
Miscellaneous	10.5	9.3

This pronounced trend to better and more responsible positions is further substantiated by a study of the income of the same alumni group over the same period.

It was found that the alumni who had been out of the School of Business not more than ten years had increased their income an aggregate of 73.2%. For those who graduated more than ten years ago, this increase amounts to 223.6%. Another study of the income of students still in school shows that the average School of Business student begins his advancement in business and in income even while he is still at his training. On the average, the increase in income during the period of attendance more than covers tuition charges.

The Student Body

The character of a student body determines the standards which a school can maintain. Nothing is more essential to the success of an educational institution than a careful selection of incoming students. This principle applies just as readily to an evening school as to a day school. Standards are invariably adjusted to the average intelligence of the students. For this reason, Northeastern University School of Business maintains standards of admission which result in a student body capable of pursuing work of standard college grade during evening hours.

In 1953–1954 the student body consisted of 4828 men and women of widely varied ages and occupations. The youngest student was 19 years of age and the oldest 54 years. The average age was 26 years.

About two-thirds of the students are married men who have realized that if they are to increase their earning power they must fit themselves for advancement. That the training offered by the School has enabled the students to improve their earning capacities and enlarge their responsibilities is conclusively proved by a study which showed that students in the School substantially increased their incomes in the six-year period between entering the School and graduation.

Placement Service

For Students

Many requests from employers are received by the School, during normal times, for young men and women of potential ability to fill important clerical and junior executive positions. It is the policy of the School to serve the students whenever possible by placing them in those positions which promise attractive opportunities for development and advancement. The School, however, cannot guarantee to place its students, but it does endeavor to keep in close touch with those who desire placement service and to assist them in obtaining satisfactory advancements in positions and income. No charge is made for placement service. Those needing this assistance should file an application at the School Office.

For Graduates

While the School cannot guarantee positions to its graduates, the number of requests for men usually exceeds the number available in the graduating class of any given year. The policy of the School is to find the best equipped and qualified men and women among its graduates for the positions which the School is called upon to fill.

The School in recommending a graduate for a position furnishes the prospective employer with the facts as to the graduate's ability, character, attitudes, habits, and other qualifications for the position as revealed by the School records. In the last analysis, however, placement in a position depends quite largely upon the graduate's ability to sell his services to the prospective employer. Most employers prefer to consider two or more candidates for a position and generally request the School to suggest more than one person. Many manufacturing and commercial firms throughout New England call upon this School to assist them in filling important executive and managerial positions.

No charge is made for placement service.

School of Business

Programs of Instruction

THE SCHOOL OF BUSINESS conducts educational programs on both the undergraduate and graduate levels.

Undergraduate Division

Through its undergraduate division it aims to serve three classifications of students:

1. The Degree Candidate for either the Associate or Bachelor's Degree.

2. The Certificate Candidate, or student who needs a shorter program of courses in a well-defined area.

3. The Special Student, who is interested in one or more selected courses to meet specific needs.

Major programs of instruction are offered in the following fields:

Accounting
Degree curricula with specification in:

Management
Degree curricula with specification in:

Engineering and Management

Law and Business

Liberal Arts and Business

Public Administration
Degree curricula with specification in:

Institute Programs

Certificate programs with specification in:

Special Programs

The School will arrange special one-year, two-year, or longer programs of study to meet the needs of individual students. These special programs will be arranged upon consultation with the Dean.

Graduate Division

Effective administration of a business enterprise in our modern complex economy requires operating policies based upon the interrelationship of many factors. The function of the administrator is largely one of coordinating the knowledge and skills of specialists each trained in his respective field. Thus, it is the aim of the Graduate Division to develop future managers equipped with scope of knowledge, the proper attitude and analytical approach to situations as they develop, and the understanding necessary for the formulation of workable policies. The courses comprising the core of each student's program cut across the several major areas of operation, including advanced consideration of the varied problems of organization, production, distribution, finance, labor relations, accounting controls, etc. Opportunity is provided the student through elective courses and the thesis to pursue his major interests as well as to secure an understanding of the influences affecting our economy.

Graduate study is strongly recommended to students of superior ability. Early in their undergraduate programs they are counseled to arrange an interview with the director of graduate study who could be most helpful to them in directing their thinking toward the requirements for continued progress in their professional fields. This would provide the director with an opportunity to make certain that the students' undergraduate programs contained the courses which provide the necessary foundation for graduate study.

Admission to the graduate program is open to men and women who hold a recognized bachelor's degree and who are qualified to profit from the instruction. However, undergraduate students who have completed their course requirements at midyear may commence their graduate study in the second semester even though they might not receive their degrees until June.

A student who upon starting his final year has but five (or in unusual cases ten) semester hours of credit left to complete the course requirements for his bachelor's degree, may upon approval of the director be permitted to fill out his program by initiating graduate study in either the first or second semester. However, in such a case the student would be permitted to enroll for but one course for graduate credit during a semester.

Accounting

The Accounting Profession

Taxation, regulations governing qualifications for listing securities with the Securities and Exchange Commission, the stock exchanges, and other regulatory bodies, corporation laws affecting the preparation of financial reports, the needs of government and its many military and non-military agencies, and numerous other developments in the conduct of business have broadened the scope of accounting to such a degree that the supply of trained accountants is not adequate to meet the demand. Public accounting is a rapidly growing field and, with the increased emphasis which financial institutions are placing on certified financial statements, the need for college-trained Certified Public Accountants is increasing every year.

Opportunities in the field of accounting are many. Financial returns compare favorably with those of other professions such as law, medicine, and engineering. The normal development for those employed by an accounting firm is fairly well standardized from the position of junior accountant through those of senior and supervisor into firm membership. As a firm member, earnings may range from $7,500 to $25,000 a year and higher.

While the remuneration in the field of public accounting for properly trained men is attractive, the field of commercial and private accounting offers even greater inducement. The latest census figures show that there are 191,571 persons engaged as accountants and auditors in the United States. From trained accountants are selected many of the business and industrial executives, including office managers, comptrollers, treasurers, and other officers of business concerns. Salaries of treasurers and comptrollers vary from $4,000 to $15,000; office managers from $3,000 to $6,000; chief accountants from $2,500 to $7,500. Many senior accountants have advanced into responsible executive positions paying $10,000 and more.

The Accounting Programs

Students of accounting in the School of Business may follow programs of training in this specialized subject which prepare them to take the examination for Certified Public Accountant (C.P.A.) or to carry on work of major responsibility in commercial accounting with private or public business firms.

Thoroughness of instruction is all-important. The trained accountant must be able to adapt himself quickly to the rapidly changing conditions of modern business. He should be ready to assume executive responsibility outside the field of accounting. This involves, of course, a background of understanding of various functions of business quite apart from the specialized accounting field.

Students may register for either the Associate Degree Program, which may be completed in four years, or for the B.B.A. Degree Program, which requires six years. The shorter program is comprised specifically of accounting courses. The two additional years required in the B.B.A. Degree Program, however, provide an opportunity to study managerial and administrative subjects which give one a broader basic understanding of business at large and equip him to assume responsibility in an executive capacity.

PUBLIC ACCOUNTING (C.P.A.)

Leading to the Degree of B.B.A. in Accounting

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English............	2½	E2	Business English............	2½
A1–2	Introductory Accounting....	5	A3–4	Intermediate Accounting....	5
		7½			7½

SECOND YEAR

A5	Accounting Problems	2½	A6	Accounting Problems.......	2½
L13	Business Law I............	2½	L14	Business Law II...	2½
Ec1	Business Economics........	2½	Ec2	Business Economics	2½
		7½			7½

THIRD YEAR

A7	Advanced Acctg. Problems..	2½	A8	Advanced Acctg. Problems..	2½
L15	Business Law III..........	2½	A35	Mathematics of Accounting.	2½
A11	Fund Accounting..........	2½	OM1	Scientific Management.......	2½
		7½			7½

FOURTH YEAR

A31	Analysis Financial Statements	2½	A32	Constructive Accounting .	2½
A25	Auditing	2½	A26	Audit Practice.....	2½
Ec5	Financing Bus. Oper........	2½	Ec6	Financing Bus. Oper.	2½
		7½			7½

FIFTH YEAR

Ec11	Financial Pol. & Plg........	2½	Ec12	Financial Pol. & Plg........	2½
A41	Basic Federal Taxes........	2½	A42	Basic Federal Taxes.........	2½
A21	Cost Accounting...........	2½	A22	Cost Accounting...........	2½
		7½			7½

SIXTH YEAR

A9	C.P.A. Problems.	5	A10	C.P.A. Problems	5
A43	Advanced Federal Taxes......	2½	A44	Advanced Federal Taxes......	2½
		7½			7½

The above is a suggested program of integrated courses for those wishing to train for public accounting by certifying through the C.P.A. examinations. The courses in heavy type are required in either the associate or bachelor's degree program. The courses in regular type are supporting courses which will, in most cases, best serve as electives. Upon approval of the dean, a limited substitution for supporting courses may be arranged from those suggested below to meet more adequately the training needs of the individual student.

		Semester Hours			Semester Hours
A27	Auditing, Internal.........	2½	IR11-12	Human Relations..........	5
Ec9-10	Business Plan. and Research	5	Ec13	Investment Principles.......	2½
Ec7-8	Business Statistics.........	5	D1-2	Marketing................	5
In11-12	Casualty Insurance.........	5	OM2	Office Org. & Administration	2½
D33	Credit Fundamentals.......	2½	OM1	Office Prac., Scien. Mgmt...	2½
D34	Credit Problems...........	2½	OM4	Office Systems & Procedures	2½
Ec22	Economics, International...	2½	A50	Punched Card Accounting..	2½
PA37	Finance, Municipal	2½	RE1	Real Estate Fundamentals...	2½
OM3	Forms Design and Control .	2½	A45-46	Tax Planning.............	5
In17-18	Fidelity, Suretyship, and		A49	Tax Procedure............	2½
	Crime Insurance.........	5	IR8	Techniques of Supervision..	2½

COMMERCIAL OR INDUSTRIAL ACCOUNTING

Leading to the Degree of B.B.A. in Accounting

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English	2½	E2	Business English	2½
A1-2	Introductory Accounting	5	A3-4	Intermediate Accounting	5
		7½			7½

SECOND YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
A5	Accounting Problems	2½	A6	Accounting Problems	2½
L13	Business Law I	2½	L14	Business Law II	2½
Ec1	Business Economics	2½	Ec2	Business Economics	2½
		7½			7½

THIRD YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
A7	Advanced Acctg. Problems	2½	A8	Advanced Acctg. Problems	2½
L15	Business Law III	2½	A35	Mathematics of Accounting	2½
Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper.	2½
		7½			7½

FOURTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
A25	Auditing	2½	A27	Internal Auditing	2½
A31	Analysis of Financial Statements	2½	A32	Constructive Accounting	2½
Ec11	Financial Pol. & Plg.	2½	Ec12	Financial Pol & Plg.	2½
		7½			7½

FIFTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
A33	Budget Procedure	2½	A34	Controllership	2½
Ec7	Statistics	2½	A11	Fund Accounting	2½
A21	Cost Accounting	2½	A22	Cost Accounting	2½
		7½			7½

SIXTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
A41	Basic Federal Taxes	2½	A42	Basic Federal Taxes	2½
IM23	Management Probs. & Policies	2½	IM24	Management Probs. & Policies	2½
L16	Govt. Controls in Business	2½	IR22	Labor-Management Relations	2½
		7½			7½

The above is a suggested program of integrated courses for those wishing to train for accounting positions in commercial or industrial concerns. The courses in heavy type are required in either the associate or bachelor's degree program. The courses in regular type are supporting courses which, in most cases, will best serve as electives. To meet most adequately the specific training needs of the individual student, a limited substitution for the supporting courses suggested above may be arranged from those in the following list.

Course		Semester Hours	Course		Semester Hours
A43-44	Adv. Federal Taxes	5	Ec13	Investment Principles	2½
E6	Business Conferences	2½	D1-2	Marketing	5
Ec9-10	Business Plan. and Research	5	OM2	Office Org. & Administration	2½
In11-12	Casualty Insurance	5	OM1	Office Prac., Scien. Mgmt.	2½
D33	Credit Fundamentals	2½	OM4	Office Systems & Procedures	2½
D34	Credit Problems	2½	IR5	Psychology	2½
Ec22	Economics, International	2½	A50	Punched Card Accounting	2½
In17	Fidelity Insurance	2½	RE1	Real Estate Fundamentals	2½
PA37	Finance, Municipal	2½	A45-46	Tax Planning	5
OM3	Forms Design and Control	2½	A49	Tax Procedure	2½
IR11-12	Human Relations	5	IR8	Techniques of Supervision	2½

COST ACCOUNTING
Leading to the Degree of B.B.A. in Accounting

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English............	2½	E2	Business English............	2½
A1–2	Introductory Accounting....	5	A3–4	Intermediate Accounting....	5
		7½			7½

SECOND YEAR

A5	Accounting Problems.......	2½	A6	Accounting Problems.......	2½
L13	Business Law I.............	2½	L14	Business Law II............	2½
Ec1	Business Economics........	2½	Ec2	Business Economics........	2½
		7½			7½

THIRD YEAR

A7	Advanced Acctg. Problems..	2½	A8	Advanced Acctg. Problems..	2½
L15	Business Law III...........	2½	A35	Mathematics of Accounting.	2½
Ec5	Financing Bus. Oper.	2½	Ec6	Financial Bus. Oper.........	2½
		7½			7½

FOURTH YEAR

A25	Auditing.	2½	A27	Internal Auditing..........	2½
A31	Analysis of Financial Statements	2½	A32	Constructive Accounting....	2½
Ec11	Financial Pol. & Plg.........	2½	Ec12	Financial Pol. & Plg.	2½
		7½			7½

FIFTH YEAR

A33	Budget Procedure..........	2½	A34	Controllership..............	2½
A21	Cost Accounting............	2½	A22	Cost Accounting............	2½
L16	Govt. Controls in Business ...	2½	IM12	Prod. Planning & Control.....	2½
		7½			7½

SIXTH YEAR

A41	Basic Federal Taxes.........	2½	A42	Basic Federal Taxes.........	2½
IM23	Management Probs. & Policies	2½	IM24	Management Probs. & Policies	2½
A23	Advanced Cost Accounting.	2½	A24	Advanced Cost Accounting .	2½
		7½			7½

The program suggested above is designed for those who are specifically interested in training for the field of cost accounting. The courses in heavy type are required in either the associate or bachelor's degree program. The courses in regular type are supporting courses which, in most cases, will best serve as electives. To meet most adequately the specific training needs of the individual student, a limited substitution for the supporting courses suggested above may be arranged from those in the following list.

Course		Semester Hours	Course		Semester Hours
Ec9–10	Business Plan. and Research	5	IR22	Labor-Management Relations	2½
In11–12	Casualty Insurance........	5	D1–2	Marketing	5
D33	Credit Fundamentals	2½	T13–14	Motor Carrier Acctg.......	5
D34	Credit Problems	2½	OM2	Office Org. & Administration	2½
Ec22	Economics, International...	2½	OM1	Office Prac., Scien. Mgmt. ..	2½
PA37	Finance, Municipal........	2½	OM4	Office Systems & Procedures	2½
OM3	Forms Design and Control..	2½	A50	Punched Card Accounting..	2½
Ec13	Investment Principles......	2½	RE1	Real Estate Fundamentals..	2½
In17–18	Fidelity, Suretyship and Crime Insurance........	2½	A45–46	Tax Planning	5
IR11-12	Human Relations..........	5	IR8	Techniques of Supervision..	2½

BUSINESS MANAGEMENT

Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	**Business English**	2½	E2	**Business English**	2½
A13	**Managerial Accounting**	2½	A14	**Managerial Accounting**	2½
L5	**Contracts**	2½	L6	**Contracts**	2½
		7½			7½

SECOND YEAR

Ec1	**Business Economics**	2½	Ec2	**Business Economics**	2½
L7	**Corp'ns, Partnership, Agency**	2½	L8	**Corp'ns, Partnership, Agency**	2½
DI	**Marketing**	2½	D2	**Marketing**	2½
		7½			7½

THIRD YEAR

L9	Law of Sales	2½	RE1	Real Estate Fundamentals	2½
Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper.	2½
OM1	Scientific Management	2½	OM2	**Off. Organ. & Admin.**	2½
		7½			7½

FOURTH YEAR

L11	Negotiable Instruments	2½	L12	Creditors' Rights	2½
OM3	Forms Design	2½	OM4	**Off. Sys. & Procedures**	2½
Ec11	Financial Pol. & Plg.	2½	Ec12	Financial Pol. & Plg.	2½
		7½			7½

FIFTH YEAR

OM5	Systems Anal. & Imp.	2½	D33	Credit Fundamentals	2½
IR22	**Labor-Mgmt. Relations**	2½	IR8	Tech. of Supervision	2½
Ec7	**Statistics**	2½	Ec8	**Statistics**	2½
		7½			7½

SIXTH YEAR

Ec9	**Bus. Plng. & Research**	2½	Ec10	**Bus. Plng. & Research**	2½
IM23	**Management Probs. & Pols.**	2½	IM24	**Management Probs. & Pols.**	2½
IR11	**Human Relations**	2½	IR12	**Human Relations**	2½
		7½			7½

For those planning careers in the management areas of business, the above is an integrated program of suggested courses. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type will, in most cases, serve as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be selected from those listed below.

A15-16	Cost Accounting, Managerial	D36	Management of Small Business
D10	Advertising Principles	D7	Market Research
D11	Advertising Problems	IR13	Personnel Mgmt. Practices
E6	Business Conferences	D3	Tech. of Salesmanship
D34	Credit Problems	IM12	Prod. Plg. & Control
Ec21	Economic Geography	IR5	Psychology for Business
Ec22	Economics, International	E5	Public Speaking
D21-22	Foreign Trade	D31	Purchasing
L16	Govt. Cont. in Bus.	D12	Sales Executive Training
Ec13	Investment Principles	IR6	Training Methods
D3	Prin. of Salesmanship		

CREDIT AND FINANCIAL MANAGEMENT
Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English	2½	E2	Business English	2½
A13	Managerial Acctg.	2½	A14	Managerial Acctg.	2½
L5	Contracts	2½	L6	Contracts	2½
		7½			7½

SECOND YEAR

Ec1	Business Economics	2½	Ec2	Business Economics	2½
L7	Corp. Part. Agcy.	2½	L8	Corp. Part. Agcy.	2½
D1	Marketing	2½	D2	Marketing	2½
		7½			7½

THIRD YEAR

Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper.	2½
A31	Anal. of Fin. Statements	2½	D3	Prin. of Salesmanship	2½
L11	Negotiable Instruments	2½	L12	Creditors' Rights	2½
		7½			7½

FOURTH YEAR

Ec11	Financial Pol. & Plg.	2½	Ec12	Financial Pol. & Plg.	2½
L9	Law of Sales	2½	IR5	Psychology	2½
OM1	Sci. Mgmt., Off. Prac.	2½	OM2	Office Org. & Admin.	2½
		7½			7½

FIFTH YEAR

D33	Credit Fundamentals	2½	D34	Adv. Credits & Problems	2½
Ec7	Bus. Statistics	2½	Ec8	Bus. Statistics	2½
Ec13	Investment Principles	2½	Ec14	Security Analysis	2½
		7½			7½

SIXTH YEAR

Ec9	Bus. Plng. & Research	2½	Ec10	Bus. Plng. & Research	2½
Ec15	Applied Sec. Analysis	2½	Ec16	Applied Sec. Analysis	2½
IR8	Tech. Supervision	2½	Ec22	International Econ.	2½
		7½			7½

The suggested program above is designed for those training for positions in credit departments. The curriculum is designed as preparation for the examination requirements for the Associate and Fellow Awards of the National Institute of Credit. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type are suggested as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be arranged from those listed below.

D10	Advertising Principles	L16	Government Controls
D11	Advertising Problems	G200	History of Economic Thought
E6	Business Conferences	IR11-12	Human Relations
R6	Credit, Retail	Ec13	Investment Principles
Ec21	Economic Geography	IM23	Management Problems & Policies
Ec22	Economics, International	D36	Management Small Business
In17-18	Fidelity, Suretyship, and Crime Insurance	D7	Market Research
		IR5	Psychology for Business
Ec17	Finance, Public	E5	Public Speaking
D23	Foreign Trade, Legal Aspects	D31	Purchasing
D21-22	Foreign Trade, Prin. & Prac.	R6	Retail Credit
		D8	Techniques of Salesmanship

INDUSTRIAL MANAGEMENT

Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English....	$2\frac{1}{2}$	E2	Business English....	$2\frac{1}{2}$
IM1	Work Simplification I...	$2\frac{1}{2}$	IM5	Time Study I.....	$2\frac{1}{2}$
A17	Industrial Acctg.......... ...	$2\frac{1}{2}$	A18	Industrial Acctg....	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

SECOND YEAR

Ec1	Business Economics........	$2\frac{1}{2}$	Ec1	Business Economics.........	$2\frac{1}{2}$
IM2	Work Simplification II......	$2\frac{1}{2}$	IM6	Time Study II............	$2\frac{1}{2}$
IM15	Production Processes..........	$2\frac{1}{2}$	IM21	Industrial Safety............	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

THIRD YEAR

L13	Law I.....	$2\frac{1}{2}$	L14	Law II.....................	$2\frac{1}{2}$
Ec5	Financing Bus. Oper.........	$2\frac{1}{2}$	Ec5	Financing Bus. Oper........	$2\frac{1}{2}$
IM10	Synthetic Time Stds. (M.T.M.)	$2\frac{1}{2}$	IM9	Job Evaluation.............	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

FOURTH YEAR

L15	Law III....................	$2\frac{1}{2}$	IM12	Production Control........	$2\frac{1}{2}$
IM11	Prin. Production Plg.........	$2\frac{1}{2}$	IR22	Labor-Mgmt. Relations......	$2\frac{1}{2}$
Ec11	Financial Pols. & Plg.	$2\frac{1}{2}$	Ec12	Financial Pols. & Plg........	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

FIFTH YEAR

IM17	Materials Handling.........	$2\frac{1}{2}$	IM18	Mat. Hndlg. Probs..........	$2\frac{1}{2}$
IR11	Human Relations...........	$2\frac{1}{2}$	IR12	Human Relations...........	$2\frac{1}{2}$
Ec7	Statistics..................	$2\frac{1}{2}$	IM13	Quality Control.............	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

SIXTH YEAR

IM19	Plant Layout...............	$2\frac{1}{2}$	IM20	Plant Layout...............	$2\frac{1}{2}$
IM23	Mgmt. Probs. & Pols........	$2\frac{1}{2}$	IM24	Mgmt. Probs. & Pols.......	$2\frac{1}{2}$
IR23	Lab. Legislation — Union-Management Relations......	$2\frac{1}{2}$	IM8	Techniques of Supervision....	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

The above is a suggested program of courses properly integrated to provide training for employment in the manufacturing areas of industrial production. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type are suggested as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be arranged from those listed below.

IM3	Basic Technology for Production	D1-2	Marketing
E6	Business Conferences	IR5	Psychology for Indus.
Ec9-10	Business Planning & Research	D31	Purchasing
In11	Cas. Insurance (Workmen's Comp.)	E5	Public Speaking
IM25	Estimating for Production	IM14	Quality Control — Advanced
IM17	Ind. Inspection & Mats. Prod.	T1	Transportation Principles
In13-14	Fire Insurance & Allied Lines	IR6	Training Methods
IR25	Labor Agreement	IR9	Wage Administration

INSURANCE
Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
A13	Managerial Accounting	2½	A14	Managerial Accounting	2½
L5	Contracts............. ...	2½	L6	Contracts............. ...	2½
In1	Fund. of Insurance....... ..	2½	In2	Fund. of Insurance..........	2½
		7½			7½

SECOND YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
L7	Corp., Part., Agency........	2½	L8	Corp., Part., Agency	2½
PA1	American Government......	2	PA2	American Government. ..	2
E1	English I............... ...	2	E2	English I.............. ...	2
In11	Casualty Insurance.	2½	In12	Casualty Insurance..........	2½
		9			9

THIRD YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
L9	Law of Sales...............	2½	RE2	Real Estate Law & Convey...	2½
In13	Fire and Allied Lines........	2½	In14	Fire and Allied Lines........	2½
Ec1	Business Economics.........	2½	Ec2	Business Economics.........	2½
		7½			7½

FOURTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
L11	Negotiable Instruments......	2½	L12	Creditors' Rights............	2½
In15	Inland Marine Insurance....	2½	In16	Inland Marine Insurance. ...	2½
Ec7	Statistics....................	2½	Ec8	Statistics....................	2½
		7½			7½

FIFTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
In17	Fidel., Surety. & Crime Ins..	2½	In18	Fidel., Surety. & Crime Ins..	2½
In21	Life Insurance..............	2½	In22	Life Insurance............. ..	2½
Ec5	Financing Bus. Oper....... ...	2½	Ec6	Financing Bus. Oper.........	2½
		7½			7½

SIXTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
In27	Business Insurance..........	2½	In28	Business Insurance	2½
In5	Claims Procedures..........	2½	L16	Government Controls	2½
Ec11	Financial Pol. & Plg.	2½	Ec12	Financial Pol. & Plg.........	2½
		7½			7½

The above is a suggested program of integrated courses for those training for careers in one of the several areas of insurance. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type will, in most cases, serve as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be selected from those listed below.

D10	Advertising Principles	OM2	Office Organ. & Admin.
E6	Business Conferences	IR11-12	Human Relations
A15-16	Cost Accounting, Managerial	D8	Tech. of Salesmanship
A41-42	Federal Taxes, Basic	IR5	Psychology of Business & Industry
D8	Prin. Salesmanship	E5	Public Speaking
IR7	Industrial Sociology	RE1	Real Estate Fundamentals
Ec13	Investment Principles	RE7	Real Estate Finance
IM23-24	Management Problems & Policies	RE5	Real Estate Management
D36	Management of Small Business Enterprise	D12	Sales Executive Training
		OM1	Scien. Mgmt., Office Practice
D1-2	Marketing	IR8	Techniques of Supervision

INSURANCE

Designed as Preparation for C.P.C.U. Examinations
Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
In1	Fundamentals of Insurance.	2½	In2	Fundamentals of Insurance..	2½
In11	Casualty Insurance....	2½	In12	Casualty Insurance...	2½
In13	Fire Ins. & Allied Lines..	2½	In14	Fire Ins. & Allied Lines..	2½
		7½			7½

SECOND YEAR

In17	Fidel., Surety. & Crime Ins.	2½	In18	Fidel., Surety. & Crime Ins.	2½
In15	Inland Marine Insurance..	2½	In16	Inland Marine Insurance.	2½
Ec7	Statistics....	2½	D3	Prin. Salesmanship..........	2½
		7½			7½

Comprehensive Review for C.P.C.U. Examinations — Parts I & II
Scheduled toward close of Second Semester

THIRD YEAR

Ec1	Business Economics....	2½	Ec2	Business Economics. ..	2½
E1	English I......	2	E2	English I....	2
PA1	American Government.....	2	PA2	American Government.......	2
L13	Law I....	2½	IR24	Labor Legis.-Social Ins.....	2½
		9			9

Comprehensive Review for C.P.C.U. Examination — Part III
Scheduled toward close of Second Semester

FOURTH YEAR

L14	Law II......	2½	L15	Law III..	2½
RE2	Real Estate Law..	2½	IM21	Industrial Safety.... .	2½
L16	Gov. Controls in Business.....	2½	Ec22	International Economics......	2½
		7½			7½

Comprehensive Review for C.P.C.U. Examination — Part IV
Scheduled toward close of Second Semester

FIFTH YEAR

A13	Managerial Accounting.	2½	A14	Managerial Accounting..	2½
OM2	Office Organ. & Admin...	2½	Ec17	Public Finance..........	2½
Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper..	2½
		7½			7½

SIXTH YEAR

In27	Business Insurance...........	2½	In28	Business Insurance...........	2½
G200	History of Economic Thought.	2½	In5	Claims Procedure.	2½
Ec11	Financial Pol. & Plg........	2½	Ec12	Financial Pol. & Plg........	2½
		7½			7½

Comprehensive Review for C.P.C.U. Examination — Part V
Scheduled toward close of Second Semester

The courses comprising the above curriculum are specifically chosen to satisfy certain requirements of the Chartered Property and Casualty Underwriters (C.P.C.U.) Examinations. Substitutions for supporting courses may be arranged as long as the degree requirements are not violated. However, the student must appreciate the effects of such changes upon his preparation for the Examinations.

LAW AND BUSINESS
Leading to the Degree of B.B.A. in Law and Business

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
A1–2	Introductory Accounting....	5	A3–4	Intermediate Accounting. ...	5
L5	Contracts..................	2½	L6	Contracts..................	2½
		7½			7½

SECOND YEAR

L9	Law of Sales...............	2½	RE2	Real Estate Law & Convey...	2½
Ec1	Business Economics.........	2½	Ec2	Business Economics.........	2½
RE1	Real Estate Fundamentals ...	2½	IR22	Labor-Management Relations	2½
		7½			7½

THIRD YEAR

L7	Corp., Part., Agency........	2½	L8	Corp., Part., Agency........	2½
E1	Business English....... ...	2½	E2	Business English............	2½
Ec5	Financing Bus. Oper........	2½	Ec6	Financing Bus. Oper........	2½
		7½			7½

FOURTH YEAR

L11	Negotiable Instruments......	2½	L12	Creditors' Rights............	2½
D33	Credit Fundamentals.......	2½	L16	Government Controls.......	2½
A41	Federal Taxes..............	2½	A42	Federal Taxes..............	2½
		7½			7½

FIFTH YEAR

A43	Adv. Federal Taxes..........	2½	A44	Adv. Federal Taxes......	2½
IR23	Labor Legislation — Union-		IR25	Labor Contract....	2½
	Mgmt. Rel.....	2½	Ec12	Financial Pol. & Plg........	2½
Ec11	Financial Pol. & Plg........	2½			7½
		7½			

SIXTH YEAR

A45	Tax Planning...............	2½	A46	Tax Planning...............	2½
Ec9	Business Planning & Research.	2½	Ec10	Business Planning & Research.	2½
IM23	Mgmt. Probs. and Policies....	2½	IM24	Mgmt. Probs. and Policies...	2½
		7½			7½

This curriculum combines a sound program of business law with the principles of management as preparation for careers in the field of business. Students taking courses in this program to satisfy pre-legal requirements should avoid all "L" courses.

The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type are suggested as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be arranged from those listed below.

PA41	Assessing Principles	In17–18	Fidelity, Suretyship & Crime Ins.
E6	Business Conferences	In13–14	Fire Insurance and Allied Lines
Ec7	Business Statistics	PA9	International Politics
In11–12	Casualty Insurance	Ec13	Investment Principles
A21–22	Cost Accounting	Ec14	Investments, Security Analysis
PA5–6	Constitutional History, England	PA38	Law, Municipal
D34	Credit Problems	D1–2	Marketing
PA25–26	Criminology	PA35	Municipal Accounting
Ec22	Economics, International	OM2	Office Organization & Admin.
PA37	Finance, Municipal	PA7	Political Parties
RE7	Finance, Real Estate	PA10	Political Theory
PA1–2	Government, American	E5	Public Speaking
PA3–4	Government, Comparative	PA23	Sociology
PA21–22	History, United States	PA24	Social Problems & Pathology

MARKETING — SALES AND ADVERTISING
Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English	2½	E2	Business English	2½
A13	Managerial Accounting	2½	A14	Managerial Accounting	2½
L5	Contracts	2½	L6	Contracts	2½
		7½			7½

SECOND YEAR

Ec1	Business Economics	2½	Ec2	Business Economics	2½
L9	Law of Sales	2½	D3	Prin. Salesmanship	2½
D1	Marketing	2½	D2	Marketing	2½
		7½			7½

THIRD YEAR

L7	Corp'ns, Partnership, Agency	2½	L8	Corp'ns, Partnership, Agency	2½
D10	Advertising Principles	2½	D11	Advertising Problems	2½
Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper.	2½
		7½			7½

FOURTH YEAR

Ec7	Business Statistics	2½	Ec8	Business Statistics	2½
L11	Negotiable Instruments	2½	L12	Creditors' Rights	2½
E11	Financial Pol. & Plg.	2½	Ec12	Financial Pol. & Plg.	2½
		7½			7½

FIFTH YEAR

D33	Credit Fundamentals	2½	T1	Principles of Transportation	2½
Ec21	Economic Geography	2½	Ec22	International Economics	2½
D17	Advertising Media	2½	D6	Sales Promotion	2½
		7½			7½

SIXTH YEAR

D21	Foreign Trade	2½	D22	Foreign Trade	2½
D7	Market Research	2½	D5	Sales Management	2½
Ec9	Bus. Planning and Research	2½	Ec10	Bus. Planning and Research	2½
		7½			7½

The program of courses suggested above is designed to train those who are planning careers in one of the several areas of distribution.

The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type are suggested as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be arranged from those listed below.

D15	Advertising Copy		IR22	Labor-Management Relations
D16	Advertising Production		IM23–24	Management Problems and Policies
D17	Advertising Media		D36	Mgmt. Small Business Enterprise
E6	Business Conferences		OM2	Office Organization & Admin.
D18	Consumer Packaging		IR5	Psychology for Business
A15–16	Cost Accounting, Managerial		E5	Public Speaking
D34	Credit Problems		D31	Purchasing
R6	Credit, Retail		RE1	Real Estate Fundamentals
D24	Foreign Marketing		RE2	Real Estate Law and Conveyancing
PA8	Foreign Policy, American		R2	Retail Store Merchandising
L16	Government Controls		D3	Tech. of Salesmanship
IR11–12	Human Relations		D12	Sales Executive Training
E9–10	Industrial Journalism		IR8	Techniques of Supervision
D9	Industrial Packaging		T3	Traffic Management
Ec13	Investment Principles			

OFFICE MANAGEMENT
Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English	2½	E2	Business English	2½
L5	Contracts	2½	L6	Contracts	2½
A13	Managerial Accounting	2½	A14	Managerial Accounting	2½
		7½			7½

SECOND YEAR

Ec1	Business Economics	2½	Ec2	Business Economics	2½
L7	Corp., Partnership, Agency	2½	L8	Corp., Partnership, Agency	2½
OM1	Scientific Mgmt., Office Prac.	2½	OM2	Office Organ. & Admin.	2½
		7½			7½

THIRD YEAR

L9	Law of Sales	2½	RE1	Real Estate Fundamentals	2½
D33	Credit Fundamentals	2½	D34	Credit Problems	2½
Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper.	2½
		7½			7½

FOURTH YEAR

Ec7	Statistics	2½	IR8	Techniques of Supervision	2½
In11	Cas. Insurance (Work. Comp.)	2½	D31	Purchasing	2½
L11	Negotiable Instruments	2½	L12	Creditors' Rights	2½
		7½			7½

FIFTH YEAR

OM3	Forms Design & Control	2½	OM4	Office Systems & Procedures	2½
IR11	Human Relations	2½	IR12	Human Relations	2½
Ec11	Financial Pol. & Plg.	2½	Ec12	Financial Pol. & Plg.	2½
		7½			7½

SIXTH YEAR

Ec9	Bus. Planning & Research	2½	Ec10	Bus. Planning & Research	2½
IR13	Personnel Man. Practice	2½	IR24	Labor Legis. — Standards & Conditions of Employment	2½
OM5	Systems Anal. & Imp.	2½	IR14	Practical Training Methods	2½
		7½			7½

The professional field of office management requires special training in modern scientific principles of management. The suggested program above provides an integration of courses as training for this important function of business management. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type are suggested as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be arranged from those listed below.

D10	Advertising Principles	E9–10	Industrial Journalism
E6	Business Conferences	Ec13	Investment Principles
A15–16	Cost Accounting, Managerial	IM9	Job Analysis & Evaluation
R6	Credit, Retail	IR22	Labor-Management Relations
IR15	Employment Testing	D1–2	Marketing
In17–18	Fidelity, Suretyship, and Crime Insurance	IR5	Psychology for Business & Industry
L16	Government Controls	E5	Public Speaking
D3	Prin. Salesmanship	IR6	Training Methods

PERSONNEL AND INDUSTRIAL RELATIONS
Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English	2½	E2	Business English	2½
Ec1	Business Economics	2½	Ec2	Business Economics	2½
IM1	Work Simplification I	2½	IM5	Time Study I	2½
		7½			7½

SECOND YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
A13	Managerial Accounting	2½	A14	Managerial Accounting	2½
IM9	Job Analysis & Evaluation	2½	IR24	Labor Leg.—Stds. & Cond. of Employment	2½
IR22	Labor-Management Relations	2½	IM6	Time Study II (M.T.M.)	2½
		7½			7½

THIRD YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
L13	Law I	2½	L14	Law II	2½
IR23	Lab. Leg.—Union-Mgmt. Rel.	2½	IR5	Industrial Psychology	2½
Ec5	Financing Bus. Oper.	2½	Ec12	Financing Bus. Oper.	2½
		7½			7½

FOURTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
L15	Law III	2½	IR25	The Labor Agreement	2½
Ec7	Statistics	2½	Ec8	Statistics	2½
IR11	Human Relations	2½	IR12	Human Relations	2½
		7½			7½

FIFTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
IR13	Personnel Management Practices	2½	IR6	Practical Training Methods	2½
IM8	Techniques of Supervision	2½	IR15	Empl. Test.—Selec. & Place.	2½
Ec11	Financial Pol. & Plg.	2½	Ec12	Financial Pol. & Plg.	2½
		7½			7½

SIXTH YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
IM21	Industrial Safety	2½	IR27	Labor Relations Seminar	2½
OM2	Office Organ. & Admin.	2½	IR9	Wage Administration	2½
E9	Industrial Journalism	2½	E-10	Industrial Journalism	2½
		7½			7½

The above is a suggested program of courses integrated so as to provide understanding of principles underlying sound human relations policies. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type will in most cases serve as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for the supporting courses may be selected from those courses listed below.

E6	Business Conferences	IM23–24	Management Problems and Policies
Ec9–10	Business Planning and Research	D1–2	Marketing
In11	Cas. Ins. (Workmen's Comp.)	OM1	Office Mgmt., Scientific Mgmt.
A15–16	Cost Accounting, Managerial	D3	Principles of Selling
PA25–26	Criminology	IM12	Production Control
L16	Government Controls	E5	Public Speaking
Ec13	Investment Principles	PA23	Sociology

PRODUCTION MANAGEMENT
Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
IM3	Basic Technology for Prod. .	2½	IM7	Ind. Insp. and Mat. of Prod..	2½
IM1	Work Simplification I.......	2½	IM5	Time Study I...............	2½
E1	Business English............	2½	E2	Business English...........	2½
		7½			7½

SECOND YEAR

IM15	Production Processes........	2½	IM9	Job Analysis & Evaluation ..	2½
A17	Industrial Accounting.......	2½	A18	Industrial Accounting.......	2½
IM2	Work Simplification II......	2½	IM6	Time Study II...............	2½
		7½			7½

THIRD YEAR

IM11	Prin. Production Plg........	2½	IM12	Production Control........	2½
IM10	Synthetic Time Std. (M.T.M.)	2½	IM21	Industrial Safety............	2½
Ec7	Bus. and Ind. Statistics I.....	2½	IM13	Quality Control in Industry.	2½
		7½			7½

FOURTH YEAR

IM25	Estimating for Production...	2½	D31	Purchasing..................	2½
IM17	Materials Handling.........	2½	IM18	Mat. Hndg. Probs............	2½
Ec1	Business Economics.........	2½	Ec2	Business Economics.........	2½
		7½			7½

FIFTH YEAR

IR5	Psy. for Bus. & Industry	2½	IR8	Techniques of Supervision ..	2½
IR11	Human Relations	2½	IR12	Human Relations	2½
Ec5	Financing Bus. Oper........	2½	Ec6	Financing Bus. Oper........	2½
		7½			7½

SIXTH YEAR

IM19	Plant Layout.................	2½	IM20	Plant Layout.................	2½
IR22	Labor-Mgmt. Relations	2½	IR6	Pract. Training Methods ..	2½
IM23	Management Probs. & Pols..	2½	IM24	Management Probs. & Pols. .	2½
		7½			7½

For those engaged in or planning careers directly related to the plant ends of production, the above suggested curriculum would in most cases provide a most adequate program of training. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type are suggested as effective supporting courses. A limited substitution for these supporting courses, however, may be arranged from those listed below whereby the specific training needs of the individual student may be more adequately met.

IM14	Adv. Quality Control	IR7	Industrial Sociology
E6	Business Conferences	IR23	Lab. Leg. —Union-Mgmt. Relations
Ec8	Bus. & Indus. Statistics II	IR24	Lab. Leg. — Stds. & Cond. of Emp.
Ec9–10	Bus. Planning & Research	IR25	Labor Agreement
In11	Casualty Insurance —	D1–2	Marketing
	Workmen's Comp.	OM2	Office Organization &
L5–6	Contracts		Administration
Ec11–12	Fin. Pol. & Plg.	IR13	Personnel Mgmt. & Practices
L16	Government Controls	E5	Public Speaking
IM22	Industrial Experimentation	IR9	Wage Administration

REAL ESTATE

Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English	2½	E2	Business English	2½
A13	Managerial Accounting	2½	A14	Managerial Accounting	2½
E5	Public Speaking	2½	D3	Prin. Salesmanship	2½
		7½			7½

SECOND YEAR

Ec1	Business Economics	2½	Ec2	Business Economics	2½
RE1	Real Estate Fundamentals	2½	RE2	Real Est. Law & Convey.	2½
D1	Marketing	2½	D2	Marketing	2½
		7½			7½

THIRD YEAR

RE11	Real Est. App. — Residential	2½	RE13	Real Est. App. — Commercial	2½
Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper.	2½
L13	Business Law I	2½	L14	Business Law II	2½
		7½			7½

FOURTH YEAR

RE7	Real Estate Finance	2½	RE5	Real Est. Mgmt.	2½
L15	Business Law III	2½	Ec7	Statistics	2½
Ec11	Financial Pol. & Plg.	2½	Ec12	Financial Pol. & Plg.	2½
		7½			7½

FIFTH YEAR

Ec13	Investment Principles	2½	OM2	Office Organ. & Administration	2½
In13	Fire Ins. and Allied Lines	2½	In14	Fire Ins. and Allied Lines	2½
RE9	Real Est. Sales & Adver.	2½	RE17	Small Home Const. & Est.	2½
		7½			7½

SIXTH YEAR

In11	Casualty Insurance	2½	In12	Casualty Insurance	2½
Ec9	Bus. Planning & Research	2½	Ec10	Bus. Planning & Research	2½
RE15	City & Regional Planning	2½	RE6	Operating a Real Estate Bus.	2½
		7½			7½

The above is a suggested program of integrated courses providing practical instruction for those working in or planning careers in the field of real estate. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type will, in most cases, serve as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be selected from those listed below.

D10	Advertising Principles	In15–16	Inland Marine Insurance
PA41	Assessing Principles	In21–22	Life Insurance
E6	Business Conferences	IR22	Labor-Management Relations
In27–28	Business Insurance	IM23–24	Mgmt. Problems & Policies
D33	Credit Fundamentals	D7	Market Research
L16	Government Controls	R6	Consumer Credit
In17–18	Fidelity, Suretyship & Crime Ins.	OM1	Scientific Management
IR11–12	Human Relations		

RETAILING

Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
Ec1	Business Economics	2½	Ec2	Business Economics	2½
L5	Contracts	2½	L6	Contracts	2½
E1	Business English	2½	E2	Business English	2½
		7½			7½

SECOND YEAR

D1	Marketing	2½	D2	Marketing	2½
L9	Law of Sales	2½	D3	Principles of Salesmanship	2½
A13	Managerial Accounting	2½	A14	Managerial Accounting	2½
		7½			7½

THIRD YEAR

R1	Retail Store Merchandising	2½	R2	Retail Store Merchandising	2½
L7	Corp., Partnership, Agency	2½	L8	Corp., Partnership, Agency	2½
Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper.	2½
		7½			7½

FOURTH YEAR

R6	Consumer Credit	2½	R4	M'dise Display Techniques	2½
L11	Negotiable Instruments	2½	L12	Creditors' Rights	2½
D10	Advertising Principles	2½	R3	Retail Store Advertising	2½
		7½			7½

FIFTH YEAR

Ec7	Business Statistics	2½	R5	Retail Store Management	2½
Ec9	Bus. Planning & Research	2½	Ec10	Bus. Planning & Research	2½
Ec11	Financial Pol. & Plg.	2½	Ec12	Financial Pol. & Plg.	2½
		7½			7½

SIXTH YEAR

IR11	Human Relations	2½	IR12	Human Relations	2½
D7	Market Research	2½	D36	Management Small Business	2½
D6	Sales Promotion	2½	IR6	Practical Training Methods	2½
		7½			7½

For those planning careers in the field of retail store distribution, the above is an integrated program of suggested courses. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type are suggested as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be arranged from those listed below.

D11	Advertising Problems	IR24	Labor Legislation — Standards & Cond. of Employment
D15	Advertising Copy		
D17	Advertising Production	IR22	Labor-Mgmt. Relations
E6	Business Conferences	OM2	Office Organ. & Administration
Ec21	Economic Geography	IR13	Personnel Mgmt. Practices
Ec22	Economics, International	IR5	Psychology for Business
IR15	Employment Testing	E5	Public Speaking
D23	Foreign Trade, Legal Aspects	D31	Purchasing
D21–22	Foreign Trade, Principles & Prac.	D12	Sales Executive Training
L-16	Government Controls	D5	Sales Management
Ec13	Investment Principles	OM1	Scientific Mgmt., Office Prac.
Ec14	Investments, Security Analysis	IR8	Techniques of Supervision

TRANSPORTATION AND TRAFFIC MANAGEMENT
Leading to the Degree of B.B.A. in Management

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
E1	Business English	2½	E2	Business English	2½
Ec1	Business Economics	2½	Ec2	Business Economics	2½
T1	Transportation Practices	2½	T3	Traffic Management	2½
		7½			7½

SECOND YEAR

A13	Managerial Accounting	2½	A14	Managerial Accounting	2½
L13	Bus. Law I—Contracts, Agency	2½	L14	Bus. Law II—Sales, Neg. Inst.	2½
T5	ICC Practice & Procedure	2½	T6	ICC Practice & Procedure	2½
		7½			7½

THIRD YEAR

Ec5	Financing Bus. Oper.	2½	Ec6	Financing Bus. Oper.	2½
L15	Law III—Partnerships, Corp.	2½	L16	Gov't Controls in Business	2½
T7	Rates and Tariffs	2½	T8	Rates and Tariffs	2½
		7½			7½

FOURTH YEAR

T25	Transportation Insurance	2½	T23	Air Cargo Transportation	2½
T11	Motor Carrier Operations	2½	IR8	Techniques of Supervision	2½
T15	Freight Claims for Loss & Damage	2½	IM21	Industrial Safety	2½
		7½			7½

FIFTH YEAR

T4	Adv. Traffic Mgmt. Probs.	2½	IM17	Materials Handling	2½
T9	Commercial Warehousing	2½	T21	Ocean Transportation	2½
D9	Ind. Packaging & Packing	2½	T17	Adv. Transportation Economics	2½
		7½			7½

SIXTH YEAR

IR11	Human Relations	2½	IR12	Human Relations	2½
D1	Marketing	2½	D2	Marketing	2½
T13	Motor Carrier Accounting	2½	T14	Motor Carrier Accounting	2½
		7½			7½

For persons employed in or wishing to train for positions in the broad field of transportation, the above is an integrated program of suggested courses. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type will, in most cases, serve as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be selected from those listed below.

D10	Advertising Principles		IR22	Labor-Mgmt. Relations
E2	Business Conferences		IR25	Labor Agreement
Ec9–10	Business Planning and Research		D36	Mgmt. Small Business Enterprise
A15–16	Cost Accounting, Managerial		IM17	Materials Handling
D33	Credit Fundamentals		Ec11-12	Financial Pol. & Plg.
D34	Credit Problems		OM1	Sci. Mmgt., Office Practice
Ec21	Economic Geography		OM2	Office Organ. and Administration
Ec22	Economics, International		D3	Principles of Selling
D23	Foreign Trade, Legal Aspects		IR5	Psychology of Business & Industry
D21–22	Foreign Trade, Prin. & Prac.		E5	Public Speaking
Ec13	Investment Principles		RE1	Real Estate Fundamentals
IR23	Labor Legis., Union-Mgmt. Rela.		Ec7	Statistics
IR24	Labor Legis., Stds. and Cond. Empl.		IR6	Training Methods

MUNICIPAL MANAGEMENT
Leading to the Degree of B.B.A. in Public Administration

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
PA1	American Government......	2	PA2	American Government......	2
E1	English I.................	2	E2	English I.................	2
Ec1	Business Economics........	2½	Ec2	Business Economics........	2½
L5	Contracts.................	2½	L6	Contracts.................	2½
		9			9

SECOND YEAR

PA21	U. S. History..............	2	PA22	U. S. History..............	2
PA3	Comparative Government.....	2	PA4	Comparative Government.....	2
L7	Corp'ns, Partnership, Agency	2½	L8	Corp'ns, Partnership, Agency	2½
A13	Managerial Accounting	2½	A14	Managerial Accounting......	2½
		9			9

THIRD YEAR

PA5	Constitutional History........	4	PA6	History American Foreign Policy	4
PA23	Sociology..................	4	PA24	Social Probs. & Pathology ..	4
L11	Negotiable Instruments......	2½	L12	Creditors' Rights...........	2½
		10½			10½

FOURTH YEAR

Ec5	Financing Bus. Oper.........	2½	Ec6	Financing Bus. Oper.........	2½
PA11	Taxation..................	2½	RE2	Real Estate (Law)..........	2½
PA25	Criminology...............	2	PA26	Criminology...............	2
PA10	Political Theory.............	2	PA9	International Politics........	2
		9			9

FIFTH YEAR

PA31	Prins. of Public Works	2½	PA38	Municipal Law.............	2½
PA39	Techniques of Mun. Mgmt...	2½	PA37	Municipal Finance..........	2½
PA35	Municipal Accounting I.....	2½	PA40	State & Local Relations.....	2½
		7½			7½

SIXTH YEAR

PA43	Coun.-Mgr. — Pub. Relations	2½	PA44	Coun.-Mgr. — Pub. Relations	2½
PA36	Municipal Accounting II....	2½	PA41	Principles of Assessing.	2½
PA33	Public Works II	2½	PA34	Public Works II.............	2½
		7½			7½

The above is an integrated program of suggested courses for providing specialized training for those training for employment with municipal governments.

The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type are suggested as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for those supporting courses may be arranged from those listed below.

E6	Business Conferences	D1–2	Marketing
Ec11–12	Financial Pol. & Plg.	D24	Marketing, Foreign
RE	City & Regional Planning	IR5	Psychology for Business & Industry
Ec13	Investment Principles	E5	Public Speaking
D23	Foreign Trade, Legal Aspects	RE13	Real Estate Appraisal — Commer.
D21–22	Foreign Trade, Prin. & Prac.	RE11	Real Estate Appraisal — Residential
		OM1	Scientific Mgmt., Office Practices

STATE AND FEDERAL ADMINISTRATION
Leading to the Degree of B.B.A. in Public Administration

FIRST YEAR

Course No.	First Semester	Semester Hours	Course No.	Second Semester	Semester Hours
PA1	American Government......	2	PA2	American Government......	2
E1	English I..................	2	E2	English I..................	2
Ec1	Business Economics........	2½	Ec2	Business Economics........	2½
L5	Contracts.................	2½	L6	Contracts.................	2½
		9			9

SECOND YEAR

PA21	U. S. History..............	2	PA22	U. S. History..............	2
PA3	Comparative Government...	2	PA4	Comparative Government...	2
L7	Corp'ns, Partnership, Agency	2½	L8	Corp'ns, Partnership, Agency	2½
A13	Managerial Accounting......	2½	A14	Managerial Accounting......	2½
		9			9

THIRD YEAR

PA5–6	Constitutional History	4	PA8	History Am. Foreign Policy..	4
PA23	Sociology...................	4	PA24	Social Probs. & Pathology....	4
L11	Negotiable Instruments.....	2½	L12	Creditors' Rights............	2½
		10½			10½

FOURTH YEAR

Ec5	Financing Bus. Oper........	2½	Ec6	Financing Bus. Oper........	2½
PA11	Taxation..................	2½	RE2	Real Estate (Law)...... .	2½
PA25	Criminology................	2	PA26	Criminology.....	2
PA10	Political Theory............	2	PA9	International Politics........	2
		9			9

FIFTH YEAR

L16	Government Controls......	2½	Ec17	Public Finance...	2½
Ec11	Financial Pol. & Plg........	2½	Ec12	Financial Pol. & Plg........	2½
Ec21	Economic Geography.......	2½	Ec22	International Economics....	2½
		7½			7½

SIXTH YEAR

G204	Government and Business...	2½	PA40	State and Local Relations....	2½
OM2	Office Organization..........	2½		Area Study.................	4
D21	Foreign Trade..............	2½	D22	Foreign Trade..............	2½
		7½			9

The above is an integrated program of courses designed to assist those working for or planning careers in governmental service. The courses in heavy type are required in either the associate or bachelor's degree program. Those in regular type will, in most cases, serve as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for these supporting courses may be selected from those listed below.

PA41	Assessing Principles		D1–2	Marketing
E6	Business Conferences		D24	Marketing, Foreign
RE	City & Regional Planning		IR5	Psychology for Business & Industry
PA37	Finance, Municipal		E5	Public Speaking
Ec13	Investment Principles		RE13	Real Estate App.-Commercial
D23	Foreign Trade, Legal Aspects		RE11	Real Estate App.-Residential
D21–22	Foreign Trade, Prin. & Prac.		OM1	Scientific Mgmt., Office Practices
PA39	Mgmt., Municipal, Techniques		PA40	State and Local Relations

Engineering and Management Program

Leading to the Degree of B.B.A. in Engineering and Management

The Engineering and Management curriculum offers training which combines the fundamental courses in engineering and business for those now engaged in or who aspire to positions of managerial responsibility in commercial or industrial enterprises where a technical background is required.

The engineering requirements may be satisfied by graduation from an engineering college. The School of Business in conjunction with the Lincoln Technical Institute, an affiliated school of Northeastern University, offers a six-year program leading to the degree of Bachelor of Business Administration in Engineering and Management.

The management requirements of thirty (30) semester hours plus *Business Readings must be completed in the School of Business. Students having satisfactorily completed any of the required courses elsewhere will substitute other elective courses of equal credit.

Requirements for the Degree of Bachelor of Business Administration in Engineering and Management

			Semester Hours
Engineering Courses (minimum requirements)			60
Management Courses in School of Business (minimum requirements)			
Required Courses of all degree candidates:			
Business Economics	5		
Managerial Accounting (Industrial Accounting for students pursuing Production Option)	5		
Business Law I, II, III	7½	17½	
Elective Courses chosen from one of the options outlined below		12½	30
*Business Readings		—	5
**Occupational Experience			30
Total Semester Hours Required for Degree			125

OPTIONS

Technical Sales	Semester Hours	Production	Semester Hours
†Principles of Selling	2½	†Work Simplification I	2½
†Sales Management	2½	†Time Study I	2½
†Market Research	2½	†Job Analysis	2½
†Marketing	5	†Prin. Production Planning	2½
Principles of Advertising	2½	†Production Control	2½
Economic Geography	2½	Quality Control	2½
Foreign Trade	5	Materials Handling	2½
Business English	5	Plant Layout	2½
		Production Processes	5
		Production Estimating	5

Administrative		Pre-Graduate Program	
Office Organization	2½	†Marketing	5
Credits	2½	†Labor-Management Relations	2½
Purchasing	2½	†Prin. Production Planning	2½
†Human Relations	5	†Production Control	2½
Government Controls	2½	†Financing Bus. Oper.	5
†Business English	5	†Statistics	2½
Management Small Business	2½		

*The Business Readings is not a classroom course, but is designed to broaden the student's acquaintance with selected readings in the field of business management. Courses of equal semester hours credit (five semester hours) may be substituted for Business Readings.

**Occupational Experience is awarded to a maximum of ten semester hours for each of the last three years. The award is based on the nature and quality of the student's employment during this period.

†Recommended electives.

Combined Program in Liberal Arts and Business
Leading to the Degree of Bachelor of Business Administration

There are several areas of employment which require as preparatory training a natural combination of liberal arts with business courses. To meet this need the Evening College of Liberal Arts offers in conjunction with the School of Business a six-year program leading to the degree of Bachelor of Business Administration with specifications.

The degree requires satisfactory completion of three years of study in liberal arts (72 semester hours of credit) plus forty-five (45) semester hours of credit in business courses. The programs as outlined below in the several options are designed to provide the most adequate preparation for the specific areas of work.

Degree Program	Semester Hours
Liberal Arts:	
The equivalent of three full years of courses in the Evening College of Liberal Arts	72
Business:	
Courses totaling forty-five (45) semester hours in one of the options listed below	45
Occupational Experience:	
Occupational Experience is awarded to a maximum of ten (10) semester hours. The award is based on the nature and quality of the student's occupation during his enrollment	10
Total semester hours required for degree	127

*OPTIONS

Personnel and Industrial Relations *Semester Hours*

Labor-Management Relations	2½
Human Relations	5
Business Law	2½
Labor Legislation — Union-Management Relations	2½
Labor Legislation — Standards and Conditions of Employment	2½
Statistics	5
Job Evaluation	2½
Managerial Accounting	5
Personnel Management Practices	2½
Labor Agreements	2½
Practical Training Methods	2½
Wage Administration	2½
Industrial Sociology	2½
Labor Relations Seminar	2½
Techniques of Supervision	2½

Pre-Legal

Introductory Accounting	5
Intermediate Accounting	5
Financing Bus. Oper	5
Real Estate Fundamentals	2½
Real Estate Law & Conveyancing	2½
Basic Federal Taxes	5
Labor-Management Relations	2½
Government Controls in Business	2½
Labor Legislation — Union-Management Relations	2½
Labor Agreement	2½
Public Speaking — Parliamentary Procedure	2½
Statistics	5
Elective	2½

Law and Management *Semester Hours*

Contracts	5
Financing Bus. Oper	5
Law of Sales	2½
Corp., Partnership, Agency	5
Managerial Accounting	5
Real Estate Law & Conveyancing	2½
Negotiable Instruments	2½
Creditors' Rights	2½
Labor-Management Relations	2½
Labor Legislation — Union-Management Relations	2½
Basic Federal Taxes	5
Tax Planning	5

Administrative

Managerial Accounting	5
Business Law	7½
Financing Bus. Oper	5
Business Statistics	5
Scientific Management — Office Practice	2½
Office Organization and Administration	2½
Forms Design and Control	2½
Office Systems and Procedures	2½
Human Relations	5
Practical Training Methods	2½
Techniques of Supervision	2½
Electives	5

Sales	Semester Hours
Marketing	5
Managerial Accounting	5
Business Law	$7\frac{1}{2}$
Prin. Salesmanship	$2\frac{1}{2}$
Techniques of Salesmanship	$2\frac{1}{2}$
Consumer Packaging	$2\frac{1}{2}$
Sales Management	$2\frac{1}{2}$
Business Statistics	5
Market Research	$2\frac{1}{2}$
Advertising Principles	$2\frac{1}{2}$
Sales Promotion	$2\frac{1}{2}$
Business Planning and Research	5

Public Administration	Semester Hours
Managerial Accounting	5
Business Law	$7\frac{1}{2}$
Financial Pol. & Plg.	5
Financing Bus. Oper.	5
Government Controls in Business	$2\frac{1}{2}$
Real Estate Fundamentals	$2\frac{1}{2}$
Real Estate Law and Conveyancing	$2\frac{1}{2}$
Municipal Law	$2\frac{1}{2}$
Municipal Finance	$2\frac{1}{2}$
Techniques of Municipal Management	$2\frac{1}{2}$
State and Local Relations	$2\frac{1}{2}$
Real Estate Appraisal	$2\frac{1}{2}$
Principles of Assessing	$2\frac{1}{2}$

*Special programs may be arranged to meet specific needs of the student upon approval of the dean.

Credit and Financial Management Institute

Business Management and the public are becoming increasingly aware of the responsibilities and professional obligations of the credit executive, whose work covers every important area of commercial and industrial activity. Credit dispositions affect the economic, social and moral welfare of peoples of all levels of our national life.

For the persons aspiring to a career in credit management, training on a professional level is a necessity. The program offered in the CREDIT AND FINANCIAL MANAGEMENT INSTITUTE and through the B.B.A. Degree curriculum is designed to qualify credit office personnel and others, whose interests and work are indirectly related to credit functions, for posts of greater responsibility and trust.

The Boston Chapter, National Institute of Credit, co-operates with the School of Business, Northeastern University, in sponsoring these courses of training. Satisfactory completion of the courses prepares the students for the examination to qualify for the Awards of Associate and Fellow of the National Institute of Credit. Examinations are set and given by the National Institute. Students are asked to consult with the dean for details of the examinations and awards.

The Certificate Program

The CREDIT AND FINANCIAL MANAGEMENT INSTITUTE of the School of Business awards Certificates upon completion in the School of Business of the required courses listed below plus additional elective courses to equal forty (40) semester hours of credit.

Required Courses

Course Numbers	Courses	Semester Hours of Credit
D 33	Credit Fundamentals	2½
D 34	Advanced Credits and Credit Problems	2½
A 13–14	Managerial Accounting	5
Ec 1–2	Business Economics	5
Ec 5–6	Financing Business Operations	5
L 13	Law I (Contracts and Agency)	2½
L 12	Creditors' Rights	2½
E 5	Public Speaking	2½
D 8	Principles of Salesmanship	2½
L 11	Negotiable Instruments	2½

Elective Courses

D 1–2	Marketing	5
Ec 11–12	Financial Policy and Planning	5
IR 8	Techniques of Supervision	2½
IR 5	Psychology	2½
OM 2	Office Organization and Administration	2½
D 31	Purchasing	2½
A 31	Analysis Financial Statements	2½
D 21–22	Foreign Trade, Principles and Practices	5
E 1–2	Business English	5

B.B.A. Degree in Credit Management

Credits earned in any of the above courses may be applied toward the requirements for the B.B.A. Degree in Management — Credit and Financial Management Option as shown on page 30.

Institute for Business and Professional Secretaries

Today, more than ever, with the increased tempo of defense production, business and industry are looking toward qualified women to assume positions of administrative responsibility. To meet these needs women with secretarial training may supplement this background with further knowledge and information through professional courses related to the operations of their respective departments or organizations. The combination of proficiency in the secretarial sciences with training through specialized courses related to their fields of employment considerably enhances their value and provides the avenue for advancement into positions of major importance with higher salaries. For those who have not had previous instruction in secretarial science, such courses will be included in their programs. Advanced standing credit, up to a maximum of fifteen (15) semester hours, may be awarded to those who have satisfactorily completed courses elsewhere and/or can achieve satisfactory performance in the secretarial sciences through proficiency examinations.

Students may register for individual courses, complete the requirements of forty-five (45) semester hours for the Certificate, or apply the credits earned toward the B.B.A. Degree in any of the curricula outlined on pages 26 to 43.

The program for each student will be recommended and planned on an individual conference basis. In each case, however, there will be a core of basic required courses which will be supplemented by elective courses selected to serve most adequately the student's specific needs. Certain suggested programs are outlined below.

Required Courses

Course No.		Semester Hours	Course No.		Semester Hours
S1	Shorthand I (Elementary)	2½	E1	Business English—Bus. Corr.	2½
S2	Shorthand II (Intermediate)	2½	E2	Business English—Rep. Writing	2½
S3	Typewriting I (Elementary)	2½	OM2	Office Organ. & Admin.	2½
S4	Typewriting II (Intermediate)	2½	OM1	Scientific Man. in Off. Prac.	2½

Suggested Electives in Specialized Areas

Accounting
A41–42	Basic Federal Taxes	5
Ec1–2	Business Economics	5
L13, 14, 15	Business Law I, II, III	7½
A36	English for Accountants	2½
L16	Government Controls	2½
A13–14	Managerial Accounting	5
A5–6	Managerial Cost Acctg.	5
Ec5–6	Financing Bus. Oper.	5

Credit Management
A31	Anal. Fin. Statements	2½
Ec1–2	Business Economics	5
E5–6	Financing Bus. Oper.	5
L13, 14, 15	Business Law I, II, III	7½
D34	Credit, Advanced Probs.	2½
D33	Credit Fundamentals	2½
A13–14	Managerial Accounting	5
Ec5–6	Money and Banking	5
IR5	Psychology for Business	2½
R6	Retail Credit	2½

Advertising
D15	Advertising Copy	2½
D17	Advertising Media	2½
D10	Advertising Principles	2½
D16	Advertising Production	2½
D8	Human Side of Selling	2½
E9–10	Industrial Journalism	5
D7	Market Research	2½
D1–2	Marketing	5
R4	Merch. Dis. for Sales Prom.	2½
D18	Packaging for Sales	2½
IR5	Psychology for Business	2½
R3	Retail Store Advertising	2½
D6	Sales Promotion	2½

Finance
A31	Analysis Fin. Statements	2½
Ec1–2	Business Economics	5
Ec5–6	Financing Bus. Oper.	5
Ec9–10	Bus. Plan. & Research	5
Ec7–8	Business Statistics	5
Ec13	Investments, Principles	2½
A13–14	Managerial Accounting	5
Ec5–6	Money and Banking	5
Ec11–12	Financial Pol. & Plg.	5

Engineering
IM3	Basic Tech. for Prod.	2½
Ec7–8	Business Statistics	5
A17–18	Industrial Accounting	5
IM22	Industrial Experimentation	2½
IM7	Ind. Insp. & Mats. of Prod.	2½
IM11	Principles of Production	2½
IM12	Prod. Plng. & Con.	2½
IM15–16	Production Processes	5
IM13	Statistical Qual. Cont.	2½
IM1	Work Simplification I	2½
	Special Technical Courses	

Foreign Trade
Ec1–2	Business Economics	5
Ec7–8	Business Statistics	5
Ec21	Economic Geography	2½
D21–22	Foreign Trade	5
Ec22	Internat'l Economics	2½
D23	Leg. Aspects For. Trade	2½
L13, 14, 15	Bus. Law I, II, III	7½
A13–14	Managerial Accounting	5
D1–2	Marketing	5
D7	Market Research	2½
Ec5–6	Financing Bus. Oper.	5

Course No.		Semester Hours
Insurance		
In11–12	Casualty Insurance.......	5
In17–18	Fidelity, Surety. & Crime .	5
In13–14	Fire & Allied Lines......	5
In15–16	Inland Marine..........	5
In5	Claims Procedure........	2½
In21–22	Life Insurance..........	5
In23	Group Insurance........	2½
In1–2	Fundamentals, Insurance .	5
L13, 14, 15	Bus. Law I, II, III........	7½
A13–14	Managerial Accounting...	5
Ec7–8	Statistics..............	5
IR11–12	Human Relations........	5
Law		
A41–42	Basic Federal Taxes......	5
L5–6	Contracts..............	5
L7–8	Corp., Part., Agcy........	5
L12	Creditors' Rights.........	2½
L16	Government Controls....	2½
L9	Law of Sales............	2½
L20	Legal Research..........	2½
A13–14	Managerial Acctg.... ...	5
L11	Negotiable Instruments...	2½
RE1	Real Est. Fundamentals...	2½
RE2	R.E. Law & Convey.....	2½
PA23	Sociology..............	4
PA25	Criminology............	4
Office Management		
Ec1–2	Business Economics......	5
A33	Credit Fundamentals.....	2½
IR15	Employment Testing......	2½
OM3	Forms Design...........	2½
IR11–12	Human Relations........	5
IM9	Job Anal. & Evaluation..	2½
A13–14	Managerial Accounting...	5
OM4	Office Syst. & Proc.......	2½
IR6	Prac. Training Methods...	2½
IR5	Psychology for Business...	2½
D31	Purchasing.............	2½
IR8	Tech. of Supervision.....	2½
Personnel and Industrial Relations		
Ec7–8	Business Statistics........	5
In11	Cas. Ins.—Work. Comp..	2½
IR15	Employ. Testing.........	2½
IR11–12	Human Relations........	5
IR5	Industrial Psychology.....	2½
IR25	Labor Agreements........	2½
IM9	Job Anal. & Evaluation..	2½
IR23	Labor Leg., Un.-Mgmt. Rel.	2½
IR24	Lab. Leg., Stds. & Cond. Emp..................	2½
IR22	Lab.-Mgmt. Relations	2½
A13–14	Managerial Accounting ..	5
IR13	Persnl. Mgmt. Practices ...	2½
IR6	Prac. Training Methods...	2½
IM5	Time Study I............	2½
Production		
IM3	Basic Tech. for Prod......	2½
L13, 14, 15	Bus. Law I, II, III........	7½
A17–18	Industrial Accounting....	5
IM7	Ind. Insp. & Mats. of Prod.	2½
IM21	Industrial Safety.........	2½
IM9	Job Analysis.............	2½
IM11	Principles of Production..	2½
IM12	Prod. Plan. & Control...	2½
IM15–16	Production Processes.....	5

Course No.		Semester Hours
Production, *Cont.*		
D31	Purchasing.............	2½
IM5	Time Study I...........	2½
IM1	Work Simplification I.....	2½
Purchasing		
Ec7–8	Business Statistics........	5
D21–22	Foreign Trade...........	5
A17–18	Industrial Accounting....	5
IM7	Ind. Insp. & Mats. of Prod.	2½
L13, 14, 15	Bus. Law I, II, III........	7½
D3	Tech. of Salesmanship...	2½
IM15–16	Production Processes.....	5
IM13	Quality Control..........	2½
Real Estate		
RE1	Real Est. Fundamentals ..	2½
RE2	R.E. Law & Convey.....	2½
RE7	Real Estate Finance......	2½
RE5	R.E. Invest. & Mgmt.....	2½
RE9	R.E. Selling & Adv.......	2½
RE6	Operating R.E. Bus......	2½
RE11	R.E. Appraisal—Resi......	2½
RE13	R.E.Ap.—Comm. & Ind..	2½
Ec1–2	Business Economics......	5
L13, 14, 15	Bus. Law I, II, III........	7½
In11–12	Casualty Insurance.......	5
In13–14	Fire Insurance..........	5
A13–14	Managerial Accounting...	5
Ec5–6	Financing Bus. Oper......	5
Retailing		
A13–14	Managerial Accounting...	5
D1–2	Marketing..............	5
R4	Merch. Dis. for Sales Prom.	2½
IR11–12	Personnel Admin.........	5
IR6	Prac. Training Methods...	2½
D3	Prin. Salesmanship.......	2½
IR7	Psychology for Business..	2½
R3	Retail Store Advertising..	2½
R6	Retail Credit.............	2½
R1–2	Retail Store Merchan.... .	5
R5	Retail Store Management.	2½
Sales		
D15	Advertising Copy........	2½
D17	Advertising Media.......	2½
D10	Advertising Principles....	2½
D16	Advertising Production...	2½
L13, 14, 15	Business Law I, II, III.....	7½
Ec7–8	Business Statistics........	5
D33	Credit Fundamentals.....	2½
A13–14	Managerial Accounting...	5
D1–2	Marketing..............	5
D7	Market Research.........	2½
D18	Consumer Packaging	2½
D3	Prin. Salesmanship.......	2½
D5	Sales Management.......	2½
D6	Sales Promotion.... ...	2½
Transportation & Traffic Management		
T13–14	Motor Carrier Acctng....	5
T5–6	I.C.C. Prac. & Proc.....	5
T11	Motor Carrier Opera.....	2½
T7–8	Rates and Tariffs.........	5
T3	Traffic Management......	2½
T1	Transportation Practices..	2½
In11–12	Casualty Insurance.......	5
In15–16	Inland Marine Insurance.	5
L13, 14, 15	Business Law I, II, III.....	7½
A13–14	Managerial Accounting...	5

Institute of Insurance

Designed to meet a demand for a practical approach to the basic principles and practices of current procedures and operations in the field of insurance, the Institute of Insurance offers an integrated program of courses, each closely interrelated with the appropriate policy forms, endorsements and manuals.

These courses should prove of especial value to office workers in insurance companies as a preparation for advancement or for those who may be employed as or who plan to train to become agents, brokers, fieldmen or underwriters.

The complete program including thirty (30) semester hours may be completed in two academic years. The courses will include those listed below as required courses, plus other elective courses to make a total of thirty (30) semester hours.

Required Courses

Course Numbers	Courses	Semester Hours of Credit
In 11–12	Casualty Insurance	5
In 13–14	Fire and Allied Lines	5
In 15–16	Inland Marine Insurance	2½
In 21–22	Life Insurance	5
In 17–18	Fidelity and Surety Bonds and Crime Insurance	5

Elective Courses

A 13–14	Managerial Accounting	5
Ec 1–2	Business Economics	5
L 13, 14, 15	Business Law I, II and III	7½
Ec 7–8	Business Statistics	5
Ec 5–6	Financing Business Operations	5
IM 21	Industrial Safety	2½
D 3	Prin. Salesmanship	2½
E 5	Public Speaking	2½

B.B.A. Degree in Management

Credits earned in any of the above courses may be applied toward the ninety (90) semester hours required for the B.B.A. Degree in Business Management as shown on page 32. Students registering for this program should consult with the dean to arrange a program of courses which will most adequately satisfy their training needs.

Institute of Municipal Management

The increasing complexity of the administrative functions of city and town governments presents problems requiring the application of business and technical knowledge of a practical and specialized nature. Today, as never before, each community is in partnership with the state and federal government and at either state or local level a better understanding of the needs of each is essential for anyone in an administrative position.

The INSTITUTE OF MUNICIPAL MANAGEMENT is designed to provide an integrated program of courses dealing with the *practical administration* of municipal governments.

The courses should have direct values for those currently employed in one of the various municipal operating departments; elected officers of the local governments; members of appropriations or finance committees; town meeting members; and others interested in effective administration of their community affairs. The program is especially designed for city or town managers, or for those planning professional careers in that field.

The Certificate Program

The Certificate requires the completion in the School of Business of thirty (30) semester hours of credit comprising the courses listed below. Students who have completed previously in another institution any of the required courses may substitute other courses related to the field upon approval of the dean.

Required Courses

Course Numbers	Courses	Semester Hours of Credit
PA 31	Principles of Public Works	2½
PA 38	Municipal Law	2½
PA 39	Techniques of Municipal Administration	2½
PA 37	Municipal Finance	2½
PA 35	Municipal Accounting — I	2½
PA 40	State and Local Relations	2½
PA 33–34	Public Works — II	5
PA 43–44	Council-Manager Relations	5
PA 36	Municipal Accounting — II	2½
PA 41	Principles of Assessing	2½

The student may select an individual course, complete the requirements for the Certificate, or use the credits as satisfying part of the requirements for the B.B.A. Degree.

B.B.A. Degree in Public Administration

Students wishing to pursue their study toward the B.B.A. Degree in Public Administration should consult with the dean to arrange a program to apply the credits earned in the Institute Program. The full degree curriculum is shown on pages 42 and 43.

Institute of Retailing

Rapid changes have come about in the distribution of merchandise. This is especially true in the retail store phase of the field. During recent years, many factors such as rapidity of style changes, the increase in size of retail stores, and the keenness of competition have helped to make the management of a retail business more complex and difficult. Progressive stores have already done considerable in the nature of applying the scientific approach to some of these problems. In such a fast moving field, the store management is constantly in search of those who are qualified through adequate training and experience to assume responsibility and authority.

The courses included in the Institute of Retailing are designed to provide an integrated program of study for men and women who desire to train for positions of managerial responsibility in the field of retailing. Students may register for single courses or for the complete programs leading to

I. The Certificate
II. The Degree of Associate in Management
III. The Degree of Bachelor of Business Administration in Management

I. The Certificate Program

The Certificate requires the completion of the thirty (30) semester hours of credit in the Required Courses listed as follows:

Required Courses

Course Numbers	Courses	Semester Hours of Credit
Ec 1–2	Business Economics	5
D 1–2	Marketing Principles	5
D 3	Principles of Salesmanship	2½
R 1–2	Retail Store Merchandising	5
D 10	Advertising Principles	2½
R 3	Retail Store Advertising	2½
R 6	Consumer Credit	2½
R 5	Retail Store Management	2½
R 4	Display Techniques	2½
		30

II. The Degree of Associate in Management

The Associate Degree may be earned by completing a total of sixty (60) semester hours. In addition to the above thirty semester hours of required courses, the student must complete thirty semester hours of additional credit in courses chosen in consultation with the dean.

III. B.B.A. Degree in Management

Students wishing to apply credits in either of the above programs toward the B.B.A. Degree should consult with the dean who will arrange a program of courses to meet the degree requirements, allowing specialization in the field of retailing.

SPECIAL COURSES

Each year special courses will be offered in specific aspects of retailing. Many of these courses will be accepted for degree credit as elective courses.

Institute of Transportation and Traffic Management

Transportation as a phase of the distribution of raw materials and processed merchandise is assuming a degree of major importance in our American economy. The flexibility of the trucking industry is changing many of our concepts of inventories and methods of operation. This, plus the cost factor, requires effective management of the handling and shipment of goods.

Two standards of professional achievement exist today in the field of Transportation and Traffic Management. One is admission to practice before the bar of the Interstate Commerce Commission; the other is admission to the American Society of Traffic and Transportation, Inc. Examinations for the former are given twice yearly by the Interstate Commerce Commission. Successful completion of the examination qualifies one to present cases and represent clients before the Commission. Examinations for the latter are announced periodically by the association. Successful completion of the examination carries with it a certificate of accomplishment that is very highly regarded in the fields of Transportation and Traffic Management.

The Institute program outlined below is designed to accomplish two objectives: (1) Provide an intensive training in the fields of Transportation and Traffic Management, as well as a supplementary background in the broader aspects of business administration; (2) prepare individuals specifically for the two examinations discussed above. The courses marked with an asterisk (*) are those most necessary for this preparation.

The Certificate Program

To qualify for the Certificate, a student must complete the following required courses, plus a sufficient number of elective courses to make a total of thirty (30) semester hours.

Required Courses

Course Numbers		Courses	Semester Hours of Credit
T	1	Transportation Practices	2½
T	3	*Traffic Management	2½
T	4	*Advanced Traffic Management Problems	2½
T	5–6	*I.C.C. Practice and Procedure	5
T	7–8	*Rates and Tariffs	5
T	15	*Freight Claims for Loss and Damage	2½

Elective Courses

T	9	Commercial Warehousing	2½
T	11	Motor Carrier Operations	2½
T	13–14	Motor Carrier Accounting	5
T	17	*Advanced Transportation Economics	2½
T	21	Ocean Transportation	2½
T	23	Air Cargo Transportation	2½
T	25	Transportation Insurance	2½
Ec	1–2	*Business Economics	5
L	13, 14, 15	Business Law I, II and III	7½
L	16	*Government Controls in Business	2½
D	9	Industrial Packaging and Packing	2½

B.B.A. Degree in Management

Credits earned in any of the above courses may be applied toward the ninety (90) semester hours required for the B.B.A. Degree in Business Management as shown on page 41. Students registering for this program should consult with the dean to arrange a program of courses which will most adequately satisfy their training needs.

Labor Relations Institute

The management of labor relations presents the most vital and challenging aspect of our industrial development of the immediate future. Continuance of our American way of industrial democracy demands a harmonious understanding of the underlying principles of labor and industrial management for the peaceful adjustment of their common problems.

The Labor Relations Institute of Northeastern University was organized to serve this need. It is dedicated to the service of both labor and management. It directly concerns the work of industrial and labor executives, plant managers, personnel directors, union shop councillors and stewards.

Required Courses

LABOR-MANAGEMENT RELATIONS — The history and development of Collective Bargaining

LABOR LEGISLATION — Union-Management Relations

THE LABOR AGREEMENT — Negotiation and Administration

LABOR RELATIONS SEMINAR

Elective Courses

MANAGERIAL ACCOUNTING
CONFERENCE LEADERSHIP
INDUSTRIAL PSYCHOLOGY
INDUSTRIAL SAFETY
JOB EVALUATION, MERIT RATING
LABOR LEGISLATION — Conditions of Employment
PRACTICAL TRAINING METHODS

WORK SIMPLIFICATION I
WORK SIMPLIFICATION II
HUMAN RELATIONS
EMPLOYMENT TESTING
PUBLIC SPEAKING
TIME STUDY I
TIME STUDY II
WAGE ADMINISTRATION

Students may register for the complete program or may take any one or more of the courses which serve their particular needs. They may complete the entire program by attending two evenings per week for two years. Each individual course is one semester or seventeen weeks in length and carries two and one-half semester hours of credit for students qualified for the degree programs of Northeastern University Evening School of Business.

Advisory Committee

The Advisory Committee to the Labor Relations Institute is composed of representatives of labor, management, and public agencies. They were chosen on the basis of their leadership in the field, their broad-minded approach to labor-management problems, and their interest in education as a means of developing better relationships.

BERNARD M. ALPERT, Regional Director
National Labor Relations Board

J. WILLIAM BELANGER
Textile Workers of America

OSCAR B. BENSON
Industrial Relations Department
Boston Edison Company

JACOB BLUME
Amalgamated Clothing Workers of America

ALBERT COULTHARD, Former Commissioner
Massachusetts Labor Relations Commission

JAMES J. HEALY, Labor Arbitrator
Former Assistant N. E. Regional Director
War Labor Board

KENNETH KELLEY, Secretary-Treasurer
Massachusetts State Federation of Labor

ANDREW C. KUHN
Director of Industrial Relations
Stop and Shop, Inc.

E. ROBERT LIVERNASH
Industrial Relations Manager
J. F. McElwain Company

WENDELL D. MACDONALD, Regional Director
Bureau of Labor Statistics, U. S. Department of Labor

JAMES NELSON, Assistant Regional Director
U. S. Department of Labor

GEORGE E. ROEWER, Attorney

Office Management Institute

The profession of office management has developed rapidly in scope and status in response to the technical and diversified nature of the problems arising and the current trends toward the scientific approach to the solutions of these problems. Heretofore, the efforts toward simplified work procedures have been related primarily to the plant ends of production. Its extension to office procedures is vital to the necessary reduction of the ever-mounting overhead created by increased costs.

The Office Management Institute is designed to serve those already employed in the field by providing instruction necessary for simplification and standardization of their operational tasks. The courses should have an appeal for systems analysts, accountants, office managers, sales managers, engineers, comptrollers, etc. It also provides a formal and planned program of training for those intending to make their careers in this profession.

The student may select an individual course, complete the requirements of the Certificate Program, or use the credits earned toward the B.B.A. Degree.

The Certificate Program

The Certificate requires the completion of thirty (30) semester hours of credit from courses selected from those listed below:

Required Courses

SCIENTIFIC MGT. IN OFFICE PRACTICE	2½	OFFICE ORGANIZATION AND ADMINISTRATION	2½
FORMS DESIGN AND CONTROL	2½	OFFICE SYSTEMS AND PROCEDURES	2½
MANAGERIAL ACCOUNTING (or equivalent)	5	TECHNIQUES OF SUPERVISION	2½

Elective or Related Courses

BUSINESS ENGLISH	LABOR-MANAGEMENT RELATIONS
BUSINESS CONFERENCES	PRACTICAL TRAINING METHODS
EMPLOYMENT TESTING	STATISTICS, BUSINESS & INDUSTRIAL
HUMAN RELATIONS	WAGE ADMINISTRATION

B.B.A. Degree in Management

Credits earned in any of the above courses may be applied toward the ninety (90) semester hours required for the B.B.A. Degree in Business Management as shown on page 36. Students registering for this program should consult with the dean to arrange a program of courses which will most adequately satisfy their training needs.

Production Management Institute

The Production Management Institute presents an integrated program of courses for those specifically related to or interested in the plant ends of manufacturing. With each course designed to treat the subject matter in detail and thereby stand alone as a unit, the program achieves integration by the use of projects which carry through the several courses in sequence, developing a complete picture of the methods and procedure encountered in the over-all practical problems of production. This integration makes possible the thorough study of a highly technical field with limitless detail which otherwise could be approached only in a superficial manner.

This program should have direct values to those currently employed in one of the several operating manufacturing departments as well as those who wish to plan for careers in this area of management.

The student may select an individual course, complete the requirements of the Certificate Program, or use the credits earned toward the B.B.A. Degree in the Production Management curriculum outlined on page 38.

The Certificate Program

The Certificate requires the completion in the School of Business of thirty (30) semester hours of credit from courses listed below. Students who can establish proficiency in any of the required courses through practical experience, or who have completed any of them previously in another institution, may substitute other related courses upon approval of the dean.

Required Courses

Course Numbers	Courses	Semester Hours of Credit
IM3	Basic Technology for Production	2½
IM25	Estimating for Production	2½
A17–18	Industrial Accounting	5
IM11	Principles of Production Planning	2½
IM12	Production Control	2½
IM15	Production Processes	2½
IM1	Work Simplification I	2½

Elective Courses

Course Numbers	Courses	Semester Hours of Credit
Ec7	Business & Industrial Statistics	2½
IM7	Industrial Inspection & Materials of Production	2½
IM21	Industrial Safety	2½
IM9	Job Analysis and Evaluation	2½
IR25	Labor Agreement	2½
IR22	Labor-Management Relations	2½
IM17	Materials Handling	2½
IM18	Materials Handling Problems	2½
IR11–12	Human Relations	5
IM19–20	Plant Layout	5
IR6	Practical Training Methods	2½
IM13	Quality Control in Industry	2½
IM10	Synthetic Time Standards (M.T.M.)	2½
IR8	Techniques of Supervision	2½
IR5	Time Study I	2½
IM2	Work Simplification II	2½

B.B.A. Degree in Production Management

Credits earned in any of the above courses may be applied toward the ninety (90) semester hours required for the B.B.A. Degree in Production Management. Students registering for this program should consult with the dean to arrange for a program of courses which will most adequately satisfy their training needs.

Quality Control Institute

The application of statistical methods to the control of quality — a comparatively new management tool — has produced significant results in:

> Improved quality of manufactured product
> Increased productivity of labor and machines
> Reduction in scrap, rework, tool and machine down-time costs
> Decrease in rejects
> Increased effectiveness of supervision
> Improved quality of purchased materials
> Providing of scientific analysis of product specification

Quality Control has effective application to both large and small organizations. It warns when trouble is imminent and tells where and when to look for the source of the trouble. It indicates when a process should be changed for increased economy. By appropriate sampling techniques it provides a constant control of materials used, the production processes, and the inspection of the final product, resulting in reduction of costs and the production of a higher percentage of acceptable units.

The courses are designed to serve persons specializing in Quality Control or those wishing to include it in the Degree Program in Production Management.

The Certificate Program

The Certificate requires the completion in the School of Business of thirty (30) semester hours of credit, at least twenty (20) of which are in the required courses. The remainder may be selected from the elective courses listed or other courses related to the field after consultation with the dean.

Required Courses

Courses	Semester Hours
Basic Technology for Production	$2\frac{1}{2}$
Industrial Inspection and Materials of Production	$2\frac{1}{2}$
Business and Industrial Statistics I	$2\frac{1}{2}$
Business and Industrial Statistics II	$2\frac{1}{2}$
Quality Control in Industry	$2\frac{1}{2}$
Advanced Quality Control	$2\frac{1}{2}$
Industrial Experimentation	$2\frac{1}{2}$
Managerial Control — Quality	$2\frac{1}{2}$
Quality Control Seminar	$2\frac{1}{2}$

Elective Courses

Principles of Production Planning	$2\frac{1}{2}$
Production Processes	$2\frac{1}{2}$
Work Simplification I, II	5
Techniques of Supervision	$2\frac{1}{2}$
Psychology for Business and Industry	$2\frac{1}{2}$
Business Conferences	$2\frac{1}{2}$
Management Problems and Policies	5

B.B.A. Degree in Production Management

Credits earned in any of the above courses may be applied toward the semester hour requirements for the B.B.A. Degree in Production Management as shown on page 38. Students registering for this degree program should consult with the dean to arrange a program of courses which will most adequately serve their individual needs.

Real Estate Institute

The social and economic importance of real estate has been impressed upon us since World War II. Conditions in the field have changed rapidly since that time to the extent that real estate is no longer a local phenomenon but rather a national problem. It becomes increasingly important, therefore, that persons be trained in the economics as well as the legal and financial problems for either personal use or for operational purposes as brokers, financiers, managers, investors, or land planners.

The courses comprising the INSTITUTE OF REAL ESTATE are designed as practical tool courses for those training for or directly associated with concerns actively engaged in real estate ownership, conveyancing, and management as lawyers, real estate agents and brokers, property managers, conveyancers, builders, municipal land planners, or employees of banks, insurance companies, and other financial institutions with major investments in real estate.

Students may register in single courses or for complete programs leading to

I. The Certificate
II. The Degree of Associate in Management
III. The Degree of Bachelor of Business Administration.

The Certificate Program

To qualify for the Certificate, a student must complete in the School of Business a minimum of thirty (30) semester hours of credit. The courses will include those listed below as required, plus additional elective courses to equal the required total.

Required Courses

Course Numbers	Courses	Semester Hours of Credit
RE 1	Real Estate Fundamentals	2½
RE 2	Real Estate Law and Conveyancing	2½
RE 5	Real Estate Management	2½
RE 7	Real Estate Finance	2½
RE 6	Operating a Real Estate Business	2½
RE 9	Real Estate Sales & Advertising	2½
RE 13	Real Estate Appraisal, Commercial & Industrial Properties	2½
RE 11	Real Estate Appraisal, Residential Properties	2½
A 13–14	Managerial Accounting	5

Elective Courses

L 13, 14, 15	Business Law I, II, III	7½
Ec 1–2	Business Economics	5
Ec 7	Business Statistics	2½
RE 15	City and Regional Planning	2½
D 1–2	Marketing	5
D 3	Principles of Salesmanship	5
D 10	Principles of Advertising	2½
E 5	Public Speaking	2½
RE 17	Small Home Construction	2½

B.B.A. Degree in Management

Credits earned in any of the above courses may be applied toward the semester hour requirements for the B.B.A. Degree in Management as shown on page 39.

World Trade Institute

The United States emerged from the Second World War as a dominant world power with a tremendously expanded industrial and agricultural capacity and an enlightened awareness of its responsibilities in the community of great powers. The economic and political welfare of our country is inextricably associated with our willingness and ability to meet the challenge of raising the stricken countries to positions of self-dependency through providing the necessary goods, services and "know-how," receiving in increasing amounts the products of their industry.

Thus we can look forward to an increasingly reactivated flow of goods in international trade requiring persons adequately trained in the special problems of marketing on a global scale.

The educational objective of the WORLD TRADE INSTITUTE is to offer an intensive, practical program of integrated courses to train men and women employed by concerns engaged in foreign trade as well as to prepare those seeking future careers in this expanding field.

The Certificate Program

The Certificate requires the completion in the School of Business of thirty (30) semester hours of credit selected from the courses listed below. Students who have completed previously in another institution any of the required courses may substitute other courses related to the field upon approval of the dean.

Course Numbers	Courses	Semester Hours of Credit
Ec 1–2	Business Economics	5
Ec 21	Economic Geography	2½
D 21–22	Foreign Trade Principles and Practices	5
D 24	Foreign Marketing	2½
D 25	Global Transportation	2½
Ec 22	International Economics	2½
D 23	Legal Aspects of Foreign Trade	2½
D 1–2	Marketing	5
In 15–16	Marine Insurance	5
D 26	Seminar in World Trade	2½

The student may select an individual course, complete the requirements for the Certificate, or use the credits as satisfying part of the requirements for the B.B.A. Degree.

B.B.A. Degree in Management

Credits earned in any of the above courses may be applied toward the semester hour requirements for the B.B.A. Degree in Management, Marketing Option, as shown on page 35. Students registering for this program should consult with the dean to arrange a program of courses which will most adequately satisfy their training needs.

School of Business

Description of Courses

THE UNIVERSITY reserves the right to withdraw, modify, or add to the courses offered, or to change the order of courses in curricula as may seem advisable.

The University further reserves the right to withdraw in any year any elective or special course for which less than twelve enrollments have been received. Regular students so affected by such withdrawal will be permitted to choose some other course. In the case of special students, a full refund of all tuition and other fees will be made.

The University also reserves the right to change the requirements for graduation, tuition and fees charged, and other regulations. However, no change in tuition and fees at any time shall become effective until the school year following that in which it is announced.

All full-year courses are numbered with a double consecutive number and all half-year courses with a single number. The letter or letters immediately preceding the numbers indicate the classification of the course. The number of class sessions indicated for each course includes the final examination session. All full-year courses will have mid-year examinations and course credit will be granted on a semester basis.

ACCOUNTING (A)

Applicants for admission to the School who have had experience in accounting or bookkeeping or who have pursued systematic courses in institutions of less than college grade may take an examination for placement purposes in Introductory Accounting. Those who pass this examination will be admitted to Intermediate Accounting and may substitute an elective course in lieu of Introductory Accounting.

A 1-2 INTRODUCTORY ACCOUNTING

This course provides basic instruction for those who plan to specialize in accounting or for those who wish to enroll later for more advanced courses. Emphasis is placed upon proprietorship accounts, including books of entry, statements, business practices, adjustments, and an introduction to partnership accounts. Drill and practice work are required for proficient handling of simple accounting transactions.

(*No previous knowledge of bookkeeping or accounting necessary*)   *5 semester hours credit*

A 3-4 INTERMEDIATE ACCOUNTING

A continuation of Introductory Accounting, treating with problems of the partnership and corporate forms of business entities. Accounts for a manufacturing business are introduced. In addition to the drill and practice work on accounting technique, a mastery of many accounting principles is required.

(*Prerequisite, A 1-2*)   *5 semester hours credit*

A 5-6 ACCOUNTING PROBLEMS

This course is designed to develop the student's reasoning power and his ability to apply the proper accounting principles in solving a specific problem. Emphasis is placed on principles and their application rather than on individual situations. Subjects covered are the preparation of financial statements, accounting for and valuation of cash items, receivables, inventories, liabilities, and net worth accounts. Capital stock, treasury stock, and surplus are discussed in detail.

(*Prerequisite, A 3-4*)   *5 semester hours credit*

A 7-8 ADVANCED ACCOUNTING PROBLEMS

This course is designed primarily to meet the requirements of students intending to enter the accounting profession. Application of accounting principles to special situations such as insolvent companies, estates and trusts, installment sales and consignments. Considerable time is spent on preparation of consolidated statements.

(Prerequisite, A 5-6) *5 semester hours credit*

A 9-10 C.P.A. PROBLEMS

A complete review of the theories encountered in A 5, 6, 7, 8, 21, 22, 41, 42. This course is primarily for students intending to take the state C.P.A. examinations. Considerable practice is required, using largely problems from previous C.P.A. examinations. Emphasis is placed on the technique of adequate problem solutions.

(Prerequisite, A 7-8; 21-22; 25; 41-42; L 13, 14, 15) *10 semester hours credit*

A 11 FUND ACCOUNTING

The concept of "fund" accounting finds its application in the accounting procedures of governmental units, charities, and educational institutions. This course deals with segregation of assets and liabilities into funds and self-balancing groups required by the organization of non-profit enterprises.

Integrated into the principles of funds is the treatment of accounting controls necessitated by governmental approaches or budgets.

(Prerequisite, A 6) *2½ semester hours credit*

A 13-14 MANAGERIAL ACCOUNTING

A study of the broad background of accounting and business transactions to enable the student to analyze and interpret intelligently financial statements and other accounting reports. The course demonstrates the use of accounting in management and financial control. Topics covered are the development of accounting fundamentals, preparation of financial statements, corporation and manufacturing accounts, evaluation of balance sheet items, analysis and interpretation of financial statements and other trends, and the use of accounting as an aid to management.

(No previous knowledge of bookkeeping or accounting necessary) *5 semester hours credit*

A 15-16 MANAGERIAL COST ACCOUNTING

Increasing emphasis on the cost factors of production and distribution necessitates a fundamental knowledge of cost procedures on the part of every student training for management responsibilities. This course is designed to provide a practical and thorough coverage of basic cost procedures related to materials, labor and manufacturing expense control, and their integration with general manufacturing accounts. Job order, process and standard cost systems are studied. The important aspects of control through budgeting and financial statement analysis are integrated into the instruction.

(Prerequisite, A 13-14) *5 semester hours credit*

A 17-18 INDUSTRIAL ACCOUNTING

The intent of this course is to present the basic mechanics of accounting principles as a background for more specific consideration of cost accounting in its relationship to production. It deals with accounting fundamentals; preparation of financial statements; corporation and manufacturing accounts; evaluation of balance sheet items; manufacturing costs; the job lot cost plan; cost accounting for material, labor, departmental factory burden rates; process cost accounting; standard cost accounting; operational cost accounting; uses of accounting in control of business expenses, measurement of operations, and the formulation of business policy.

(No previous knowledge of bookkeeping or accounting necessary) *5 semester hours credit*

A 21-22 COST ACCOUNTING

Acquaints the student with the relationship of cost accounting to management and administration control and shows how adequate cost systems may further the intelligent management of business enterprises. Job order, process, and standard cost systems and their integration into the general accounting system of the business are studied. Numerous problems and sets serve as the basis for a study of the various accounts, records, systems, and methods commonly used in modern cost accounting.

(Prerequisite, A 5-6) *5 semester hours credit*

A 23-24   ADVANCED COST ACCOUNTING

Intended only for the student who desires to enter the field of cost accounting, this course presents advanced situations and the more intricate problems encountered in cost accounting for specialized businesses. Included in the course is a thorough study of distribution and administrative costs. Each topic is approached from the point of view of what management may expect and the use to which cost information may be put.

(Prerequisite, A 21-22)   *5 semester hours credit*

A 25   AUDITING

This course covers both theory and practice of auditing with emphasis on statement presentation and internal control. Procedures employed in balance sheet audits in verifying cash, receivables, inventories, investments, plant assets, intangibles, deferred charges, liabilities, capital, income, and expense accounts are covered. Attention is given to pronouncements, research bulletins and statements of auditing procedure issued by the American Institute of Accountants. Accounting theory is discussed where necessary to clarify auditing procedures.

(Prerequisite, A 5-6)   *2½ semester hours credit*

A 26   AUDIT PRACTICE

Audit Practice is offered primarily for students who intend to enter public accounting. A practice audit simulating the work of public accountants is conducted and an audit report prepared. Preparation of adequate working papers is emphasized.

(Prerequisite, A 25)   *2½ semester hours credit*

A 27   INTERNAL AUDITING

This course undertakes a study of the function of the internal auditor in ascertaining the degree of reliability of accounting and statistical data developed within the organization, the extent to which company assets are properly accounted for and safeguarded from loss, and the extent of compliance with established policies, plans, and procedures. The internal auditor's review and appraisal of the accounting, financial, and other policies and plans of the organization as a basis for protective and constructive service to management are covered. The development of working papers and writing of the report are studied and problems of human relations with personnel in other departments discussed.

(Prerequisite, A 25)   *2½ semester hours credit*

A 31   ANALYSIS OF FINANCIAL STATEMENTS

This course embodies a study of the techniques used by management, creditors, investors, and regulatory authorities in the analysis and interpretation of financial statements for the purpose of establishing credit ratings, determining the investment value of a business, testing the efficiency of operations, and determining whether financial and operating policies, methods, and practices should be continued or changed. The student's ability to analyze, question, determine significant omissions, to criticize constructively, and to distinguish between inferences and facts is developed by extensive use of published corporate reports. The companies selected for study are in industries important to the New England economy such as transportation, power, fuels, lumber, merchandising, textiles, electronics, machinery, paper, shoes, etc.

(Prerequisite, A 5-6 or A 13-14)   *2½ semester hours credit*

A 32   CONSTRUCTIVE ACCOUNTING

To acquaint students with the principles underlying the construction of accounting systems and the procedure of system installation. The course is developed by means of problem projects beginning with an analysis of the accounting needs of a small business. By gradual steps increasingly larger businesses are studied and accounting systems developed to meet their needs. Special attention is given accounting records in relation to the expansion of the accounting system.

(Prerequisite, A 5-6)   *2½ semester hours credit*

A 33   BUDGET PROCEDURE

The procedures and techniques used in preparing a comprehensive budget are discussed and illustrated by the compilation of a master budget plan from sales, production, manufacturing, selling and administrative expenses through the balance sheet and profit and loss statements. A comparison of the budget and actual financial statements is prepared with explanatory notes.

(Prerequisite, A 5-6)   *2½ semester hours credit*

A 34   CONTROLLERSHIP

The three basic objectives of the controllership function are defined as control and protection of corporate property, compliance with legal reporting and record-keeping requirements, and assistance to management in controlling operations and formulating policies. This course covers the functions and organization of the controller's department, basic techniques employed by the controller, the interpretation of historical results and their co-ordination into the broad policy-making program of the business. The technical phases of the controller's work are covered as preparation for the study of his role as reporter, adviser, and counsellor to business management at all executive levels undertaken in the latter part of the course.

(Prerequisite, A 7-8)   2½ semester hours credit

A 35   MATHEMATICS OF ACCOUNTING

Mathematical computations required in business practice and in C.P.A. examinations are covered. Considerable practice material is assigned to develop facility and accuracy in mathematics.

Arithmetical computations: Percentages, averages, interest, discounts, partial payments, installment sales, valuation of good will, logarithms, depreciation, gross profit.

Algebraic computations: Tax and bonus problems, determination of net worth of interowned companies.

Actuarial science: Compound interest, compound amounts and present values; ordinary annuities and annuities due; sinking fund computations; debt amortizations; effective interest on bonds.

(Prerequisite, A 7-8)   2½ semester hours credit

A 36   ENGLISH FOR THE ACCOUNTANT

This course is designed to promote facility of expression in accounting work. Considerable practice is required in writing answers to questions on accounting theory and in preparation of reports. Emphasis is placed on use of good grammar, complete and concise expression, and in writing so that statements cannot be misunderstood.

(Prerequisite, A 3-4)   2½ semester hours credit

A 41-42   BASIC FEDERAL TAXES

This course provides a thorough basic coverage in the principles of federal income taxes. A detailed study is made of the Federal income tax law and its application to the incomes of individuals, partnerships, corporations, and fiduciaries. Many practical tax problems are presented for study and solution.

(Prerequisite, A 3-4)   5 semester hours credit

A 43-44   ADVANCED FEDERAL TAXES

This course is designed to prepare the student to handle the complicated tax problems arising in everyday business. To give the student experience in methods used in actual tax practice, he is required to study the provisions of the Internal Revenue Code, analyze numerous special tax problems, and solve them by applying relevant provisions of tax law. Solutions must be supported by citations.

(Prerequisite, A 41-42)   5 semester hours credit

A 45-46   TAX PLANNING

An advanced course in corporate tax problems, covering tax advantages and disadvantages of the corporate form of organization; dangers of inadequate capitalization; compensation problems, including deferred compensation, bonus plans, and pension plans; problems of close corporations; the section 102 penalty; corporate reorganization and liquidation; expense accounts of executives; research and development expenses; and cancellation of indebtedness. A detailed analysis of real estate tax problems, including tax aspects of mortgages, lease agreements containing options to buy, sales and lease backs; also purchase and sale of a business, including covenants not to compete; survivorship purchase agreements; pointers on bad debts, worthlessness, and other business losses. Methods of effecting tax economies in connection with these problems will be stressed.

(Prerequisite, A 43-44 or its equivalent)   5 semester hours credit

A 47 EXCESS PROFITS TAXES

A course designed to furnish tax practitioners and corporate executives with an up-to-date and critical analysis of the Federal Excess Profits Tax Law, including more specifically:

Adjusted Excess Profits Net Income: Computation of excess profits net income of the current taxable year and adjusted excess profits net income; carry-backs and carry-overs of net operating losses; unused excess profits credit; abnormalities in current income.

The Invested Capital Credit: Calculation of invested capital; return on equity capital; on borrowed capital; deficits in capital; computation of invested capital under the historical and the asset methods.

The Average Earnings Credit: Adjustment of base period earnings; computation of average base period net income; adjustments for base period and post-base period capital changes; growth experience; abnormalities in the base period.

Relief and Other Special Provisions: New corporations; new relief provisions, including changes in taxpayer's product or services; depressed corporations; depressed business, etc.

Mergers, Consolidations and Exchanges: Excess profits credit of acquiring and component corporations; problems of consolidated returns.

Special consideration will be given to the possible means for minimizing the tax, the possible existence of the right to refund of the tax already paid and measures necessary to protect the interests of taxpayers. Pitfalls and ambiguities of the law will be pointed out.

2½ semester hours credit

A 48 MASSACHUSETTS STATE TAXES

Although the laws of the Commonwealth affecting taxation have become more involved over the years due to many court decisions and numerous interpretations by the commissioners, very little information on the subject is readily available to tax practitioners and company executives. The material for this course, especially prepared for the purpose, provides organized reference material of immediate and practical value.

Strong emphasis is placed on the elements of business income, annuities, sales of intangibles, interest and dividends, etc., basic to intelligent preparation of individual and partnership returns. Corporation income is thoroughly considered, and careful coverage made of the difficult computation of corporate excess.   *2½ semester hours credit*

A 49 TAX PROCEDURE

A course stressing the practical everyday aspects of tax procedure. Among the matters to be covered are the following:

Recent reorganization of the Bureau of Internal Revenue: changes in procedure. *Working tools of tax practice:* the code, regulations and court decisions. *How to find the law of your case:* procedure in research, methods of presentation and proof. *Preparation of returns:* procedures in preparation which will minimize possibility of field examination of return. *The audit process:* what the agent is looking for when he examines the return, investigatory powers of the Bureau. *How to represent your clients most effectively before the various branches of the Bureau:* how to effect settlements at various stages. *Preparation of protests and briefs.* Assessments of deficiency and collection of tax: liens, their operation, effect and enforcement, Statute of Limitations. *How to handle refund claims:* preparation and negotiations with respect to claims for refund. *Closing agreement and compromises based on inability to pay. Taxpayer's rulings:* procedure for obtaining these and their effect. *What is the liability of the person preparing a tax return?*

2½ semester hours credit

A 50 PUNCHED CARD ACCOUNTING

This is a special course offered in co-operation with the National Machine Accountants Association of Massachusetts. Increasingly, numerous installations of punched card accounting systems make this course of immediate and practical value to public accountants, treasurers, controllers, accountants, and supervisors of punched card installations. It provides a working knowledge of the economic possibilities of punched card accounting equipment, embracing a thorough presentation of card and forms design in the process of applying I.B.M., Remington Rand and Samas equipment to salary payroll; payroll and labor distribution; inventory and material accounting; billing; sales accounting; accounts receivable; plant and equipment accounting, etc.

(*Prerequisites, satisfactory accounting background*)   *2½ semester hours credit*

ECONOMICS (Ec)

Economics is the basic foundation upon which the general principles of business as a science are founded. A mastery of the underlying economic laws enables the student to see clearly the forces which business men must use in arriving at solutions to their problems. An appreciation and understanding of economics is a necessary factor in the equipment of a progressive business man.

Ec 1-2 BUSINESS ECONOMICS

The study of our economic society, its institutions and their practices as essential prerequisites to the successful conduct of business affairs and to the development of intelligent citizenship. The introductory course aims to provide the significant economic principles and facts about industry, labor, money, banking, the distribution of income to the factors of production, business fluctuations, and forms of social organization. Consideration is given to current economic problems, in relation to the basic principles and laws, and to their implications for individuals, business, and government, as well as society at large.

5 semester hours credit

Ec 5-6 FINANCING BUSINESS OPERATIONS

The needs for capital in the production and merchandising of goods and services; the sources of long-term and short-term funds and their utilization form the basis for the introduction to finance as a basic function of business management. Credit instruments, trade credit, secured and unsecured loans, specialized forms of short-term financing and consumer credit are considered in the first semester. Money, the commercial banking structure, the Federal Reserve System, thrift institutions and other financial agencies and services as they relate to operations of the business firm form the basis of the second semester, which concludes with brief consideration of both international and public finance.

(Prerequisite, Ec 1-2; A 1-2; 3-4; or A 13-14) *5 semester hours credit*

Ec 7 BUSINESS AND INDUSTRIAL STATISTICS

The objective of this course is to introduce students with no previous training in statistics to its practical use in analyzing problems encountered in business and industry. It presents the fundamental concepts underlying analytical method and serves as a prerequisite for advanced courses in statistics. Presented from the point of view of the business man, it is concerned with the nature and calculation of averages; measures of dispersion; measures of skewness, kurtosis, and normal curve analysis; an introduction to basic probability and its relation to sampling. Tabular and graphic presentation of data will be considered. A part of each session will be devoted to laboratory practice in the solution of problems.

2½ semester hours credit

Ec 8 BUSINESS AND INDUSTRIAL STATISTICS

This course is a continuation of Ec 7 and introduces the student to the field of time series analysis. Among the principal topics considered are the measurement of secular trends by free-hand and mathematical methods; the measurement of seasonal fluctuations; cyclical fluctuations; the general nature and calculation of index numbers; and an introduction to linear correlation. A part of each session is devoted to laboratory solution of problems.

(Prerequisite, Ec 7) *2½ semester hours credit*

Ec 9-10 BUSINESS PLANNING AND RESEARCH

To assist business men to make more definite and more accurate business decisions through a broader understanding of the significant information and statistics regarding our economic system and its operations is the major objective of this course. Sources of information, strengths and weaknesses of principal measures of business activity, and the use of several widely accepted indexes in general business forecasting are a major part of the study, as well as sales forecasting, business cycle analysis, and the effects of the broadening relation of government policies upon the individual business firm. *5 semester hours credit*

Ec 11-12 FINANCIAL POLICY AND PLANNING

This course includes a study of the corporate form of organization, the various types of securities utilized, and the financial problems involved in promotion and expansion of enterprises, in mergers, in sale of properties, and in failures and reorganizations. Attention is devoted to the planning aspects of the corporation financial officer's job with respect to budgets, operating reports and their analysis. Policy matters such as executive compensation, dividend policies, pensions and profit-sharing plans are also dealt with.

(Prerequisite, Ec 5-6) *5 semester hours credit*

Ec 13 INVESTMENT PRINCIPLES

The characteristics of the entire range of securities from government bonds to common stocks form the foundation of this course as they relate to various types of investment programs. Sources of information, mathematics and mechanics of investment and the differing analytical approach to various industries are considered primarily from the viewpoint of the individual private investor interested in practical methods of capital preservation.

(*Prerequisite, Ec 11-12*)   *2½ semester hours credit*

Ec 15-16 APPLIED SECURITY ANALYSIS

This course is designed to acquaint the student with methods used by practicing security analysts in their studies of various industries and to provide practical information useful in future analysis of companies operating in these industries. It includes review of basic principles of Security Analysis; tools used by practicing analysts; analytical study of various industries comprising our economy, including the major consumer goods, capital goods, service industries, public utilities and railroads. Practicing analysts who are specialists in their respective industries will comprise the faculty. These instructors will develop the problems affecting their industries, the methods used in appraising their outlook, and the approaches to the problems of analyzing the securities of individual companies within these industries. A term paper is required of each student, during the preparation and writing of which he is assigned to a practicing analyst for technical assistance.

(*Prerequisite, Ec 14*)   *5 semester hours credit*

Ec 17 PUBLIC FINANCE

A study of federal, state, and local taxing and spending, and of the increasing role of governments in the economy of the United States. Special attention will be paid to the problems of state and local finance in New England. Both the traditional and newer theories in this field will be covered with references to their applicability to our economy today.

2½ semester hours credit

Ec 21 ECONOMIC GEOGRAPHY

This course is concerned with the role of geography, geology, and climatology in determining the centers of population, the location of natural resources, and the development of agriculture and industry. It considers their location in terms of their natural relationship to the flow of world trade. The socio-economic principles that underlie the development of resources in different countries and climates are emphasized. It also analyzes the political-economic aspects of resource distribution and development in the form of trade and world relationship.   *2½ semester hours credit*

Ec 22 INTERNATIONAL ECONOMICS

This course attempts to analyze foreign trade and finance in terms of current practices and theories. It discusses national welfare and foreign trade; international accounting and what the balance reveals; the making of international payments and documents used; the rate of exchange; international equilibrium; foreign trade and the national income; principles behind protection; trade control through the tariff, import quotas, exchange control and their evaluation; international commodity agreements and commercial treaties; monetary policy problems; the international gold standard; exchange reserve standards; exchange stabilization fund; the shortage of dollars; the International Monetary Fund; international investments.

2½ semester hours credit

Ec 23 MANAGING PERSONAL FINANCES

The purpose of this course is to give help to young men and women with the financial problems they face in charting wise programs of handling their personal finances. It is introduced by a discussion of money, its function, dollar value, and an appreciation of true values in life, using money to achieve the same. The course continues with a consideration of the following: expense control through budgeting; wise buying methods and policies — charge accounts, installment buying; financial institutions for borrowing money; protection against risk to person and property; methods of saving; the place of life insurance in financial planning; owning a home; investing in securities; trust funds, investment trusts; making a will; business fluctuations and the planning of personal finances.   *2½ semester hours credit*

Ec 118 MONEY AND BANKING

The primary purpose of this course is to provide a comprehensive knowledge and understanding of monetary theory and credit policy. The nature of money and its contribution to our market economy, the role of the Federal Reserve System, price movements and their relationship to money supply are among the major topics considered. Monetary management, standards of credit and monetary policy are discussed with a view to evaluating the adequacy of our banking system.

(*Prerequisite, Ec 5-6*)   *2½ semester hours credit*

Ec 119   BUSINESS CYCLES AND FORECASTING

The basis of this course is the determination and analysis of the forces which produce instability in our business economy. Various theories as to the causes of cycles and the history of past fluctuations are studied to develop the ability to better appraise current economic conditions. Considerable attention is given to important statistical measures and their use in forecasting cyclical changes. Representative stabilization programs and policies are discussed and evaluated.

(Prerequisite, Ec 7-8)   2½ semester hours credit

ENGLISH (E)

The value that comes from the effective use of good English in business reports and communications is being increasingly emphasized by business leaders. All students who are candidates for the degree or certificate are required to pursue systematic courses in English. Those having outstanding deficiencies may be required to take additional courses in English.

E 1   BUSINESS ENGLISH

One of the basic requirements for success in business is the ability to express ideas in effective English. This course is designed to provide basic instruction in the fundamentals of word usage, sentence and paragraph construction. A thorough review of grammar and punctuation is provided with frequent drill. The medium of composition is the business letter. The course also includes readings and exercises in vocabulary building.

2½ semester hours credit

E 2   BUSINESS CORRESPONDENCE

This course continues the study of English 1 as it is applied to the needs of business correspondence and communications. Special emphasis is placed on the study of the business letter and the development of skills in expression with continued practice in the construction of sales, collection, credit, and application letters. The business report and the writing of business articles is given close attention.

(Prerequisite, E 1)   2½ semester hours credit

E 3   BUSINESS REPORTS

A study of the structure and organization of the various types of business reports. Assignments include the writing of progress, periodic, research, and technical reports. The student is given practice in the collection, analysis, and interpretation of data, outlining of report materials, and the preparation and use of statistics in graphs, charts, and tables.

(Prerequisite, E 1)   2½ semester hours credit

E 5   PUBLIC SPEAKING

Those who wish to speak convincingly, to overcome self-consciousness, and to develop self-confidence will find this course meeting their needs. Students are trained in the selection and organization of speech materials, the delivery of the speech, and in other important essentials of effective speaking. The entire course is practical and not theoretical. Work is centered around the interests and topics of business men and is specifically adapted to their needs.   2½ semester hours credit

E 6   BUSINESS CONFERENCES

The management of modern business is conducted to a large extent through the use of conferences. The objective of this course is to present techniques basic to group leadership. It provides instruction in the planning, participation and leading of conferences. Classes are limited in size to allow regular and frequent participation by students. The conference topics are carefully designed so that the discussions are means of disseminating very worthwhile information regarding business management problems.   2½ semester hours credit

E 9-10   INDUSTRIAL JOURNALISM

The tremendous growth in circulation of company publications calls for an increasing number of men and women trained as editors, writers, and production personnel. This course is designed to give the fundamental background for such work. It includes trade publications and their functions; house organs — internal and external; basic news gathering and writing; horizontal and vertical coverage; assignments and deadlines; copyrights and credits; publicity versus propaganda; reproduction processes; uses of color; preparation of manuscript for the printer.   5 semester hours credit

E 11 PUBLIC SPEAKING — PARLIAMENTARY PROCEDURE

This course is designed to train students in public speaking and parliamentary procedures. In content the course augments training in public speaking by adding those speech situations unique to active participation and leadership in organizations whose programs are educational, civic, social, fraternal, veteran, or labor, and whose functions as deliberative necessitate observance of basic parliamentary procedure in keeping with by-laws, constitutions, or charters. Robert's Rules of Order, Revised, is the parliamentary text used. *2½ semester hours credit*

E 12 READING SKILLS

This course, which is one part of the course E 14 Speed and Comprehension in Reading, is devoted primarily to the development of correct reading techniques which lead to the ability to read faster with a higher degree of comprehension. Exercises for improving basic speed and comprehension include work with tachistoscope and films. Special attention is given to analytical reading and the improvement of study habits. *1¼ semester hours credit*

E 13 VOCABULARY DEVELOPMENT

This course is designed to assist the student in developing an adequate vocabulary and in improving his ability to use this increased power of words for more effective presentation of ideas. It includes the important aspects in the development of the English language, how it has drawn from many other languages, important roots, prefixes and suffixes, antonyms for variety and force of expression, etc. E 12 is not a prerequisite for E 13, although one supplements the other. *1¼ semester hours credit*

E 14 SPEED AND COMPREHENSION IN READING

The ability to read well is a skill of considerable value to students and to those in professional practice. Efficiency can generally be improved by analysis with subsequent substitution of good for bad reading habits. Special equipment for instruction and drill exercises are used to increase reading rate and comprehension. Methods to improve study habits and to develop an effective vocabulary are included. *2½ semester hours credit*

INDUSTRIAL MANAGEMENT (IM)

With the complex and rapidly changing conditions of modern production, the functions of administration and management must be clearly defined and maximum economies effected. Through the problem approach, these courses train the student to supplant guesswork and trial and error processes with organized knowledge and proven management methods.

IM 1 WORK SIMPLIFICATION I

The course is designed to present the fundamental principles underlying motion analysis and work simplification. Included in the subjects considered are the following: Process and operation analysis through the use of process charts, flow diagrams, operation charts, man-and-machine charts, principles of motion economy. Work place layout, labor-saving tools and equipment, laboratory development work. Practical applications of work simplification with particular emphasis upon cost analysis. *2½ semester hours credit*

IM 2 WORK SIMPLIFICATION II

Short review of Work Simplification I. Advanced study and laboratory practice in operation analysis and improvement, man-machine charts, process charts, and micromotion study. Human relations in methods engineering. Other subjects which may be considered will be breakdown of assembly work for conveyorizing, integration of methods and time study, and methods planning.
(Prerequisite, Work Simplification I or equivalent industrial experience) 2½ semester hours credit

IM 3 BASIC TECHNOLOGY FOR PRODUCTION

This lecture and laboratory course is designed to provide students possessing non-technical educational backgrounds with a basic coverage of the fundamentals of mathematics, and shop drawing vital to study in the fields of industrial or production management.

The basic mathematics includes shop arithmetic, the mechanics of algebra approached on a functional basis, and an introduction into trigonometry applied to the right angle triangle. This is woven into the instruction in shop drawing which includes the use of drafting equipment, the principles of orthographic projection and sketching, blueprint reading or interpretation which considers the systems of dimensioning, indications of limits and tolerances, designation of locating points, commercial finishes, etc. *2½ semester hours credit*

IM 5   TIME STUDY I

Based upon the best established methods procedures, the fundamental principles of time study are considered as a basis for setting production standards. Subjects included in the course are the following: Introduction to wage incentives and current wage plans. History and development of time study, relation to motion and micromotion study, preliminary observation, technique of making time studies. Rating procedure, development of proper concept of "normal" performance, applying the rating and relaxation factors. Setting job and element standards, use of allowances, treatment of variables, introduction to standard data, synthetic standards, problems in the application of standards. Laboratory practice will supplement the classroom work.   *2½ semester hours credit*

IM 6   TIME STUDY II

Review of stop-watch time study and performance ratings. Introduction to the use of elemental time studies for developing standard data. Problems involved in setting up standard data for a variety of operations. Development of tables, families of curves, formulae, nomographs, and multi-variable charts for synthetic rate-setting purposes.
(Prerequisite, IM 5 or equivalent industrial experience)   *2½ semester hours credit*

IM 7 INDUSTRIAL INSPECTION AND MATERIALS OF PRODUCTION

Fundamental to the study of production processes and the control of quality is a knowledge of the materials of production and the techniques of inspecting the accuracy of processing. This lecture and laboratory course first considers the study of materials, especially ferrous, non-ferrous, special alloy metals, plastics, etc., in terms of their basic characteristics, e.g., structure; hardness; strength in compression, tension, shear; workability; thermal, physical, electrical and chemical properties.

The course continues into the techniques and standard measuring equipment and gauges for mechanical inspection; linear, surface, angular, gear, and thread measurements; "go and not-go" gauges of various types; gauge blocks; optical measuring and gauging practice; discussion of tolerance limitations of machine tools and other processing equipment in common use.
2½ semester hours credit

IM 9   JOB ANALYSIS AND EVALUATION

Basic principles underlying theory of wage calculation, job elements and their definitions, rating scales, writing job descriptions and specifications, selection of appropriate rating plan, setting up job factors and maximum point values, use of several methods of determining specific point values. Development of wage structures.   *2½ semester hours credit*

IM 10   SYNTHETIC TIME STANDARDS — M.T.M.

The development of time values for manufacturing operations using synthetic time standards is rapidly becoming widely established in industry, making it necessary for those in time study and its related fields to become acquainted with it. This course is designed to give the student a knowledge of the fundamentals of what is perhaps the most widely accepted system, methods-time measurement. This lecture and laboratory course discusses the basic motions and elemental time values, providing the student with an opportunity to develop time standards for actual operations encountered in manufacturing operations.
(Prerequisite, IM 5)   *2½ semester hours credit*

IM 11   PRINCIPLES OF PRODUCTION PLANNING

A basic treatment of the planning principles applied to the development and operation of a manufacturing unit, including analysis of the product to be manufactured; market and sales research; plant location; plant design and determination of required physical facilities; the internal organization; the engineering organization for development of product; distribution and control of engineering information; establishment of manufacturing budgets for control; production planning, including inventory control policy, receiving and storeskeeping, procurement; plant layout; and managerial controls to appraise manufacturing performance.
2½ semester hours credit

IM 12   PRODUCTION CONTROL

This course is a sequel to IM 11 and accents the controls required for the orderly operation of the production department. The following subjects related to planning, scheduling, and control are included: basic organization, plant layout, flow, materials specifications, sales forecasts, budgeting, planning, routing methods, plant and departmental capacities, cost, standardization, ordering, purchasing controls, receiving and storage, scheduling, materials handling, dispatching and subcontracting, machine loading, assembly, inspection, inventory control, measures of performance, co-ordination of sales and manufacturing, and introduction to mechanical means of control.
(Prerequisite, IM 11)   *2½ semester hours credit*

IM 13   QUALITY CONTROL IN INDUSTRY

An introduction to the elements of statistical quality control and its use industrially for attaining reduction in scrap and rework, lower inspection and production costs, lessened complaint and servicing bills, improvement in product uniformity and greater quality assurance. Emphasis is on the utilization of the so-called "statistical tools" to prevent the manufacture of defects. Statistical principles are demonstrated practically rather than mathematically, and actual case histories are introduced to illustrate application of methods.

Included in the subject material are determination of machine and process accuracy; use of histograms to segregate normal and abnormal variability; use of quality control charts for both measurable and non-measurable quality characteristics; rational determination of tolerances; scientific sampling methods for process control; single, double, and multiple sampling methods for acceptance of material by lots; use of Military Standard 105A; how to satisfy government quality control requirements; psychological factors in controlling quality. Students work on typical problems selected from actual cases.

(Prerequisite, Ec 7)   *2½ semester hours credit*

IM 14   ADVANCED QUALITY CONTROL

This course is designed primarily for those who require a more detailed understanding of the application of quality control techniques. The material covered in Quality Control is enlarged on and a number of the more recently developed techniques are treated in detail. Application of the methods to several particular industries, such as metal-working, textile, aircraft, chemical process, electron tube, screw machine products, is studied.

Subjects covered are special purpose control charts; multi-vari charts; rational sub-grouping principles; pictograms; PD-diagrams; principles of visual inspectors; establishing quality assurance; check inspection methods; special trouble-shooting techniques; organizing a quality control program and introducing it into the factory. Each student conducts a term project involving application of the methods in his own field.

(Prerequisite, IM 13 or equivalent)   *2½ semester hours credit*

IM 15   PRODUCTION PROCESSES

Basic to the study of production is a thorough understanding of the processes and shop production methods employed in the manufacture of products using various types of materials. Concentrated attention is applied to such processes as castings; hot-working, cold-forming, and joining of metals; machine shop production methods; plastics and plastic molding. The common production tools such as shears, presses, press brakes, lathes, boring mills, screw machines, milling machines, drills, shapers, slotters, planers, broaching machines, grinders, and saws are studied in detail including their uses, machine capacities, limitations, flexibilities, etc.

Working with actual products accompanied by production blueprints, the student determines the manufacturing processes required, selects the appropriate machines, equipment and tool setups. Under certain conditions alternate methods and equipment must be used. These are evaluated in terms of their practicality and economic advisability. Process sheets are prepared for all manufacturing operations involved for presentation to the production control department as a basis for scheduling and computation of machine loading charts.

2½ semester hours credit

IM 17   MATERIALS HANDLING

The handling of materials as an integrated part of the production program offers much promise in efficiency of operation and reduction in manufacturing costs. This course approaches the problem from both the unit workplace environment and the internal flow of raw materials through the several manufacturing processes to the storage of finished goods and their loading for shipment. Materials handling equipment will be considered in practical terms of engineering characteristics, selection for specific uses, and cost factors of operation.

2½ semester hours credit

IM 18   MATERIALS HANDLING — CASE ANALYSES

This course comprises a series of case studies, each designed to illustrate material handling problems encountered in various types of industries. In the development of the analyses, reference to source material will be required for technical data and specifications toward the selection of equipment and methods which will provide the most economic and effective operations consistent with the factors involved.

(Prerequisite, IM 17)   *2½ semester hours credit*

IM 19-20 PLANT LAYOUT

This course is taught on a combination lecture and laboratory method using the latest techniques and equipment employed in industrial practice. Instruction proceeds principally by the project method where a plant site is chosen for the manufacture of a specific product. The product is analyzed to determine the processes involved, the number and types of machines and auxiliary equipment necessary for manufacture. Flow charts are prepared and machine and equipment location determined using A.S.M.E. approved two-dimensional templates and three-dimensional scale models.

In addition to the physical arrangement of machines and equipment, consideration is given to the layout of utilities such as power, light, water, sprinklers, drainage, telephones, heating equipment, lavatories, etc. Alternate layouts are considered and all cost factors including estimates of construction changes are evaluated to determine most economical layout. Detailed attention is given to the layout of office areas and departments servicing production as well as areas designed for employee safety and convenience. Design is checked for conformance to local and state regulations pertaining to building codes, zoning, safety, and fire protection. Finished layout drawings are prepared for presentation to management.

(*Prerequisites, IM 1, IM 12, IM 15-16*)　　　　　　　　　　　　*5 semester hours credit*

IM 21 INDUSTRIAL SAFETY — INDUSTRIAL ACCIDENT CONTROL

A non-technical course dealing with the organization and administration of a comprehensive accident prevention program. It will include an analysis of the basic industrial hazards, the various factors involved in industrial accidents with corrective action; the responsibilities and functions of top management, the safety engineer, the supervisor, and the safety committee; the training of employees, supervisors and other management personnel; the investigation and analysis of industrial accidents; protective equipment and clothing; maintaining management and employee interest.　　　　　　　　　　　*2½ semester hours credit*

IM 22 INDUSTRIAL EXPERIMENTATION

The two main problems confronting experimenters in the laboratory, pilot plants, and at factory levels are the evaluation of data and the design of experiments. They are essential tools of the engineer and factory trouble-shooter. Consequently, this course dealing with tests of significance, analysis of variance, correlation techniques, and experimental design is specifically directed at producing greater efficiency and competency for quality control personnel as well as experimenters of all classes.

The section on testing the significance of averages, variances, percentages is concerned with the "u", "t", "F," "L," "J," and Chi-Square statistical tests. The course continues with process trouble-shooting methods of graphical analysis and experiment design; specific experiment designs and analysis of variance for single, double, multiple factor tests; Latin Square and Graeco-Latin Square, Incomplete Latin Square and Youden Square design; importance of balancing and randomizing; pictograms for summarizing results of experiments. The correlation techniques to be considered are the simple linear, tetrachoric, rank and multiple correlations.

The person completing the course will be equipped not only to select an efficient design for his experimental work, but will also be enabled to make an objective evaluation of the data to determine whether the variations in the data are significantly different from those which might be expected purely on a chance basis. It is important to note that the ability to make this kind of distinction helps avoid experimental blind alleys, with the associated vital savings in dollars and days.

(*Prerequisite, Ec 7 or equivalent*)　　　　　　　　　　　*2½ semester hours credit*

IM 23-24 INDUSTRIAL MANAGEMENT PROBLEMS AND POLICIES

Management case problems illustrating the co-ordination of the basic departments of the business in sales, production, personnel and finance. The cases cover a complete range of management problems and include internal administration, organization, industrial relations, expansion and contraction. The student helps to construct management policy based upon thorough analysis. The course is the gathering point for specialty courses obtained elsewhere in the curriculum.　　　　　　　　　　　*5 semester hours credit*

IM 25 ESTIMATING FOR PRODUCTION

This course is designed to tie together and put to use the material contained in several prerequisite courses. It presents the systematic procedures followed in determining the estimated cost of manufacturing a product in a competitive market. Based upon certain known contractual data such as volume, materials and manufacturing specifications, the procedures include determination of quantities of raw materials necessary, their sizes, shapes, and physical characteristics; the analysis of the required processes and individual operations, machines and equipment necessary for fabrication; the determination and cost of tools required; the analysis of direct labor required for each operation; the burden or overhead chargeable against each department; and the total manufacturing cost including the sales and administrative expense.

Working with standard data and actual products with their accompanying manufacturing blueprints, the students will calculate practical and accurate estimates presented in accepted form.

(*Prerequisites, A 17-18, IM 1, IM 15*)　　　　　　　　　　　*2½ semester hours credit*

IM 27 PLANT MAINTENANCE

Preventive maintenance of plant and equipment has an immediate relationship to the efficiency and cost of operation. This course is concerned with the organization of the maintenance department and its function as a phase of production; installation, maintenance, and repair of mechanical and electrical equipment and machines, sanitary and employee facilities, buildings and grounds; use of outside contractors; buying and storing of maintenance supplies; watchman service and plant security organization and methods.

2½ semester hours credit

IM 29 QUALITY CONTROL SEMINAR

An integrating course for those who have completed all or a majority of the courses in Quality Control. Basically designed to test the application of the students' knowledge to actual industrial situations, most of the work revolves about the students' own problems. For this reason, the course is strictly limited to those who have a full background in the subject and are in a position to devote outside time and industry to the application of quality control technology. Practice in written and oral report presentation is afforded, with emphasis on methods of selling ideas through reports. The psychology of selling statistical ideas to management is discussed. Weekly round-table discussions are held at which the students are expected to contribute their own experiences. The outside work project constitutes a large share of the course work.

(*Prerequisites, IM 14, IM 22, IM 30*)   *2½ semester hours credit*

IM 30 MANAGERIAL CONTROL — QUALITY

A major consideration for effecting a successful quality control program lies in its administration. This course is pointed at bringing an appreciation of the non-technical aspects of administering a quality control program. In developing these concepts, intensive discussion is given to economics of quality; relation of design and inspection to control of quality; organizing for quality control; quality control engineering; integration of quality functions; methods of obtaining quality assurance; and case studies.

(*Prerequisite, IM 13*)   *2½ semester hours credit*

INSURANCE (In)

In a complex economic structure, the function of risk bearing becomes vital. The Insurance industry has experienced tremendous growth in serving this need. The courses offered are basic in their presentation and are designed to train for effective careers in one of the many divisions of operation.

In 1-2   INSURANCE PRINCIPLES

A foundation course to an intelligent understanding of Casualty and Fire Insurance and its function in our economy; measurement of risk and rates; types of carriers, their organization, and regulation; loss adjustment and loss prevention; underwriting and reinsurance. The second semester is devoted to an examination of the insurance contract and to a brief survey of the principal forms of Casualty, Fire, Marine, Surety, and Disability insurance, and their uses.

5 semester hours credit

In 5   CLAIMS PROCEDURE

The function and organization of the claims department; the claims adjuster, his qualifications, duties, and responsibilities; the theory and procedures of handling insurance claims. This course presupposes a knowledge of the basic coverages, and is handled on a lecture and discussion basis, using case studies, however, limited to general casualty, fire, burglary, bonds, and inland marine insurance.

(*Prerequisites, In 11-12; 13-14; 15-16; 17-18*)   *5 semester hours credit*

In 11-12   CASUALTY INSURANCE

This is a comprehensive study of casualty insurance. It includes such insurance contracts as workmen's compensation and employers' liability, accident and health, schedule and comprehensive general liability, and miscellaneous crime coverages. Special attention is paid the policy contract, various rating procedures, endorsements, the methods used to determine premium payments, insurance auditing procedures, etc. The subjects covered are considered in detail through careful analysis of the several underlying insurance contracts.

5 semester hours credit

In 13-14   FIRE INSURANCE AND ALLIED LINES

This course includes the history and development of Standard Fire Insurance Policies, presenting a detailed study of the Massachusetts Standard Fire Policy, its modifying forms and endorsements; methods of rating; policy writing procedures; and loss handling. It includes a study of extended coverage, consequential loss contracts, and collateral fire lines.

5 semester hours credit

In 15-16   INLAND MARINE INSURANCE

Covers the origin, development and present scope of Inland Marine Insurance and a complete analysis of the provisions of transportation policies, property floaters, bailees' customers' floaters and special risk policies. The course is designed to provide a thorough grounding in the fundamental principles of Inland Marine Insurance, with special emphasis on policy forms, rates, underwriting and the applicability of the coverages to the needs of the insuring public.   *5 semester hours credit*

In 17-18   FIDELITY, SURETYSHIP, AND CRIME INSURANCE

This course is introduced by a general consideration of crime insurance. Coverage under fidelity and suretyship is discussed individually, including the various forms of fidelity, judicial, contract, public official bonds, license and permit bonds, miscellaneous surety bonds, and the comprehensive crime policies. The several bond forms under the foregoing are studied individually, supplemented by the underwriting procedures in conjunction with the use of the manuals.   *5 semester hours credit*

In 21-22   LIFE INSURANCE FUNDAMENTALS

The economic function of life insurance; the life insurance carriers; estimating the life risk; the mortality table; the Life Insurance Equation; premiums, reserves; loading; surplus and dividends; fundamental principles underlying the life insurance contract; types of policies; policy conditions; endorsements; annuities; group insurance.   *5 semester hours credit*

In 23   GROUP INSURANCE

One of the rapidly developing divisions of insurance attuned to the changing economic concepts and social consciousness of progressive management at a time when social pressure for employee security is forcing legislation in this direction. The course establishes the rightful place in modern business of employee benefit plans made possible through group insurance and emphasizing the benefits to both the management and the employee.

It considers in detail the types, characteristics, scope, and accomplishments of the several types of coverage including Group Life together with Accidental Death and Dismemberment Benefits; Accident and Sickness Benefits; Hospital and Surgical Benefits for both employees and their dependents; Group Annuities; etc. Especial attention is given to the more recent developments in Group Insurance.

Through case material it discusses the sources of prospects, presents the techniques of analysis and proposal preparation, and suggests the specific sales techniques peculiar to Group Insurance involved in the ultimate presentation and closing of sale.

2½ semester hours credit

In 27-28   BUSINESS INSURANCE

Business Insurance is concerned with the problems of business agreements involving proprietorships, partnerships, and corporations, and key men within these business structures as well as pension trusts and tax problems. The course is designed to analyze the needs in the above and to suggest insurance solutions.

Fundamentals of Estate Planning is a study of the problems involved in the ownership of properties and the protection of the estate wherein transfer costs, inheritance taxes, federal and state gift taxes, wills and trusts, rights of creditors, etc., are involved.

5 semester hours credit

LAW (L)

Underlying the ever-increasing complexity of modern business is a growing body of law which defines and directs business operations.

L 5-6   CONTRACTS

Contracts: their importance to the business man in the everyday conduct of his affairs, why contracts are necessary, how they are made and enforced; the subject matter of contracts; the rights and liabilities of the parties; the termination of contractual relationships.

5 semester hours credit

L 7-8 CORPORATIONS, PARTNERSHIPS, AGENCIES

Problems of organizing various businesses, the forms of business enterprises; the powers and liabilities of business organizations and their officers; inter-corporate problems; rights of creditors and stockholders; reorganization and termination of a business organization's affairs. Agency: the function of agents in present-day business; the legal relationships among agent, employee and third parties; the duration of agency relationship and methods of termination.

(Prerequisite, L 5-6)   5 semester hours credit

L 9 LAW OF SALES

Transfer of property interest in goods; nature of sales contracts; Statute of Frauds; seller's warranties; rights and remedies of sellers and buyers; unfair and illegal market practices such as infringements of trademarks, disparagement of competitors, etc.

(Prerequisite, L 5-6)   2½ semester hours credit

L 11 NEGOTIABLE INSTRUMENTS

Legal devices for raising money and extending credit, such as promissory notes, bills of exchange, checks, trade acceptances, bills of lading, warehouse receipts; formal requisites of negotiable paper; negotiation; discharge rights and defenses.

(Prerequisite, L 5-6)   2½ semester hours credit

L 12 CREDITORS' RIGHTS

Mortgages; pledges; conditional sales; suretyship and guaranty; bailments; bankruptcy.

(Prerequisite, L 5-6)   2½ semester hours credit

L 13 BUSINESS LAW I

Contracts: nature, kinds and formation of contracts; essential elements; form and interpretation of contracts; breach, remedies and damages. Agency: nature, purpose and formation of agency relationship; rights and duties of principal and agent, scope of agent's authority; rights and duties of principal and third persons; termination of agency. Employer and employee: compensation laws; duties of master; contributory negligence doctrine; injuries to third persons. Bailments: nature and kinds; rights and duties of parties.

2½ semester hours credit

L 14 BUSINESS LAW II

Negotiable instruments: bills, notes and checks; requirements of a negotiable instrument; negotiation; liabilities and defense of parties; procedure upon dishonor; discharge. Personal property; nature and classification, methods of acquiring title. Carriers, duties and liabilities. Sales: nature of sales contracts; warranties; transfer of title; rights and remedies of seller and buyer. Insurance: formation and function of insurance contract; kinds of policies; legal phases of life, property and other insurance. Suretyship: rights of the surety and the guarantor; rights and duties of the creditor; defenses of the surety and guarantor.

(Prerequisite, L 13)   2½ semester hours credit

L 15 BUSINESS LAW III

Partnerships: nature, kinds and formation; rights and duties of partners; partner's authority to bind firm; relation of partners and third persons; dissolution and winding up. Corporations: nature and creation; charter; powers, rights and liabilities; nature and kinds of capital stock; rights and liabilities of stockholders, directors and officers. Mortgages: rights and duties of mortgagor; rights and duties of mortgagee; rights after default. Property: landlord and tenant-relationship; classification of tenancies; rights and duties of landlord; rights and liabilities of tenant. Trusts and decedents' estates; wills and intestacy. Bankruptcy: Federal Bankruptcy Act; acts of bankruptcy; adjudication; rights and duties of bankrupt; unsecured, secured and priority claims; extensions, compositions, and other debtor-relief provisions; discharge.

(Prerequisite, L 13)   2½ semester hours credit

L 16 GOVERNMENT CONTROLS IN BUSINESS

A study of the economic and political relationships which exist between business and government with particular reference to the Sherman Act and Anti-Trust Laws; Securities and Exchange Commission; Interstate Commerce Commission; regulation of public utilities; the Co-operative Movement; the Social Security Act; government and labor; business regulation by taxation.   2½ semester hours credit

MARKETING (D)

Marketing enters into and influences every field of business and includes not only the direct process of the sale of goods, but the whole organization by which goods find their way from the original producer to the ultimate consumer. The change in the economic structure during the past ten years, growing out of higher standards of living, the development of new occupational interests, and the shift of population to large cities, has tended to increase the cost of marketing of goods. Just as the elimination of waste in production was the keynote of business fifteen years ago, the reduction of expense and the introduction of more efficient methods in distribution are the foremost thought of business leaders today. For this reason courses in marketing form one of the basic elements in a business education.

D 1-2 MARKETING

An understanding of the various methods in common use for selling goods and of the typical problems that arise in the course of distributing goods from the manufacturer through the middlemen and dealers to the consumers is provided. The selling problems of the manufacturer, the wholesaler, the retailer, and the specialty agent are studied in relation to the various types of industries and commodities.   *5 semester hours credit*

D 3 PRINCIPLES OF SALESMANSHIP

The one all-important aspect of successful salesmanship—an understanding of people, without which any sales technique becomes routine and ineffective. Based upon what makes people behave like human beings, it analyzes the basic needs, desires, tastes, habits that motivate them into buying; their individual differences — the secret to the art of selling (finding that all-important point of contact); the art of allowing people to sell themselves; factors which turn refusals into sales. A course for the veteran or the beginner.
2½ semester hours credit

D 5 SALES MANAGEMENT

This course is devoted to the function of the sales manager in terms of his relationship to the marketing process, involving the aspects of planning, investigation of the market, pricing the product, planning the sales effort, management and control of the sales personnel and sales operations. It includes in detail a study of the types of sales organizations, sales policy, sales campaigns, financing of sales, and the selection, training, and supervision of the sales force.
(*Prerequisite, D 3*)   *2½ semester hours credit*

D 6 SALES PROMOTION

The function of sales promotion; the development of plans and materials for stimulating sales; the consideration of publicity media; the preparation of direct advertising pieces for use among the sales force of the manufacturer or wholesale distributor; functions and uses of direct advertising, direct-mail advertising and radio advertising; the planning of sales campaigns; co-ordinating advertising and sales efforts; the preparation of sales manuals, display techniques, portfolios, etc., for use of the sales force.
(*Prerequisites, D 1-2, D 3, D 10*)   *2½ semester hours credit*

D 7 MARKET RESEARCH

This course deals with the techniques of research investigations in the collection and utilization of data relating to the problems of marketing. It includes the planning of mail and field investigations, preparation of material, testing results, interpretation of findings, preparation of reports leading to the development of new products, sales methods or sales areas.
(*Prerequisites, D 1-2, Ec 7, Ec 8*)   *2½ semester hours credit*

D 8 TECHNIQUES OF SALESMANSHIP

A techniques course operated on the laboratory-lecture method in which the psychological principles presented in the course, "The Human Side of Selling," are applied to the basic aspects of selling.

The student learns through visual aids, role-playing techniques, student demonstrations using modern effective equipment and techniques, guest lecturers, etc., the proper methods of approach, how to arouse the buying urge, the common obstacles met in selling, the meeting of sales resistance, the closing of the sales, etc.

The class is limited in size to guarantee adequate participation by each student.
(*Prerequisite, D 3 or equivalent in experience*)   *2½ semester hours credit*

D 9 INDUSTRIAL PACKAGING AND PACKING

The science of packaging and packing for protection during shipment has experienced rapid advance. This course is devoted to current practices of industry as well as specifications applied to government contracts. Considered in this course are the basic types of containers; inner packaging; container design and utilization; dynamics of cushioning; government packaging, packing, and marking; testing of materials and containers; consumer packing-machinery and equipment; packing, loading, and shipping heavy apparatus; specifications for materials and containers. *2½ semester hours credit*

D 10 PRINCIPLES OF ADVERTISING

A comprehensive course designed to familiarize the student with the nature and scope of advertising and its place in the commercial and economic structure. History, definition, and functions of advertising. Organization and functions of advertising departments and advertising agencies. Varieties of advertising and media. Problems, market investigation, planning campaigns. Laws, ethics, and regulations. A study of the broader aspects of advertising with special emphasis on current trends and developments.

2½ semester hours credit

D 11 ADVERTISING PROBLEMS

A course designed to bring to the student the intimate details of planning an advertising campaign; the solving of advertising objectives; and the planning of advertising strategy. Numerous actual case histories are covered in classroom discussion with particular emphasis on the latest advertising trends and practices.

(Prerequisite, D 10) *2½ semester hours credit*

D 12 SALES EXECUTIVE TRAINING

Successful sales managers do not "just happen" — they must be trained. There is no guarantee that the "star salesman" will become a successful sales manager. Every company's future is dependent upon a succession of capable men trained to manage its sales.

This purely practical course, placing special emphasis upon the sales personnel, is designed for sales managers or company sponsored salesmen who have demonstrated management potentialities; considers on an advanced level the comprehensive function of the sales manager — his varied responsibilities; the importance of setting goals; selection and training of salesmen; turnover; the high cost of sales; follow-up, records, and periodic appraisal; the function of leadership; delegation of responsibilities; motivation to procure maximum sales production.

(Prerequisite, D 8 or equivalent in experience) *2½ semester hours credit*

D 14 DIRECT MAIL ADVERTISING

A practical presentation of principles and procedures in mail-selling campaigns, including the aspects of list building; writing effective sales letters, circulars, and catalogs; copy testing; analysis of selected direct mail campaigns; printing and production methods and costs; postal rates and regulations; and intervals of mailing, etc. *2½ semester hours credit*

D 15 ADVERTISING COPY

A course designed to furnish essential groundwork for successful copy writing. Includes study of market-analysis, product and consumer research; class discussion of and participation in comparisons of media and methods, from the standpoint of the copy writer; drill and practice in writing specific industrial, general, retail, radio and mail-order advertising copy; development of techniques, vocabulary and facility.

(Prerequisite, D 10) *2½ semester hours credit*

D 16 ADVERTISING PRODUCTION

The methods and techniques of advertising production, including layouts; use of illustrations; the development of typography; types and type selection; composition; engraving processes; the several printing processes, including letterpress, lithography, and gravure; specifications and estimates.

(Prerequisite, D 10) *2½ semester hours credit*

D 17 ADVERTISING MEDIA

This course is intended to prepare the student of advertising for the intelligent choice of advertising media requisite to adequate and economical market approach and coverage. It includes practical analysis of consumer, trade and professional magazines, newspapers and other publications, direct-mail, radio and television, outdoor advertising; fundamental product research to establish criteria for advertising media selection; a study of relative values of media from the standpoint of merchandising from manufacturer, through retailers, to the consumer.

(Prerequisite, D 10) *2½ semester hours credit*

D 18 CONSUMER PACKAGING

This course is designed to cover the many problems to be reckoned with in creating a package to meet the high competition of current marketing trends with particular emphasis on color, art layout, and design for adaptability to automatic packaging equipment. It involves all of the basic package materials and forms, and includes such important topics as "The Evolution of the American Market," "Market and Consumer Research" and "Legal Protection." The course is further highlighted with lectures presented by experts from the packaging field.

2½ semester hours credit

D 21-22 PRINCIPLES AND PRACTICES OF FOREIGN TRADE

The course is designed to introduce the student to world trade, its development and current status, the economic and political developments which affect the volume and direction of the flow of goods. Subjects discussed are the balance of international payments; trade agreements; tariff and non-tariff control measures and policies; export and import departments; middlemen; foreign agents and distributors; branch houses; handling import and export traffic; study and choice of markets; settlement of trade disputes; international banking facilities, foreign credits; foreign exchange; foreign investments and foreign exchange. The execution of foreign trade documents will be carried out throughout the course. *5 semester hours credit*

D 23 LEGAL ASPECTS OF FOREIGN TRADE

A survey course of commercial law for foreign traders. It is concerned with the common legal problems in international trade. The background and development of Anglo-American and civil (or continental) legal systems are considered. The law merchant; sales; letters of credit; contracts; partnerships; taxation; bankruptcy and insolvencies; powers of attorney; trademarks, designs and commercial names; types of business organization, partnership, business corporations, and their counterparts in foreign countries; legal procedure; international trading combinations; history and background of American customs duties, customs officials and procedure in the collection of duties, American customs courts, foreign trade zones and ports; methods of settlement of trade disputes are covered.

2½ semester hours credit

D 24 FOREIGN MARKETING

The methods and procedures of selling in the foreign market. How to analyze potential markets; conduct market surveys that encompass the human, economic, competitive and geographic factors as well as the financial, commonly called the "dollar shortage." Establishing the type of distributor best suited for the product and the country concerned. Warehousing in foreign countries, advertising with an eye to local prejudices and tastes. Overcoming local inertia and competition. Protection of industrial property and trade names, shipping and documentation. Emphasis will be on selling the product, maintaining the market and the good will of the customer and overcoming competition from foreign traders from other countries in the same field. *2½ semester hours credit*

D 25 GLOBAL TRANSPORTATION

This course will be devoted to transportation by land, sea and air and the problems of global trade shipments. The economic character of the international trade transportation industry; types and methods of service, regulations and rates, and the important international treaties, conventions and agreements affecting such transportation will be emphasized.

2½ semester hours credit

D 26 SEMINAR IN WORLD TRADE

Study, investigation and conferences on special and particular problems in the field of international trade. The problems of finance, governmental regulations, legal aspects of particular countries and methods of research for the solution of questions will be covered. The round-table method will be employed and the interests of the individual members will be emphasized. The Seminar will be directed by a member of the faculty, but students will work in groups together with the various members of the faculty of the WORLD TRADE INSTITUTE. Where available, outside experts and authorities from governmental and private organizations will participate in the work of the Seminar. A thesis will constitute the final examination and will be required from students seeking credit for a Certificate or Degree.

2½ semester hours credit

D 31 PURCHASING

A practical study of the functions and duties of the purchasing agent, the organization and administration of his department, and his relations with other departments. The following are representative of subjects discussed: the purchasing function, qualifications and responsibilities of the purchasing officer; purchasing organization and procedure; quality determination, inspection and inventory control; source selection and procurement by manufacture; price policies, forward buying and procurement budgets. *2½ semester hours credit*

D 33 CREDIT FUNDAMENTALS

This course furnishes instruction in the organization and functions of the commercial credit department; the classification of credit and the several types of agencies involved; the factors involved in a credit risk; the investigation of credit factors; credit services.

2½ semester hours credit

D 34 ADVANCED CREDITS AND CREDIT PROBLEMS

This course continues into the more detailed problems of the credit manager in determining credit disposition. The following subjects are included: ratio analysis of financial statement figures, statement analysis by comparison, collection problems and procedures, insolvency and its various forms, creditors' legal aids, credit insurance and guaranties, the general problems of the credit manager in administering his function of the business organization, activities of the National Association of Credit Men.

(*Prerequisite, D 33*)   *2½ semester hours credit*

D 35 CONSUMER CREDIT

This course covers all phases of credit extended to consumers—retail stores; bank personal loans; consumer financing by banks; real estate financing; bank charge account plans; small loan companies; sales finance companies; utility companies; credit investigation and evaluation; collection procedures; Credit Bureau operations; legal aspects of credit.

2½ semester hours credit

D 36 MANAGEMENT OF A SMALL BUSINESS ENTERPRISE

The financial, legal and general management essentials involved in organizing and operating a small to medium-sized concern. The course discusses the following: factors in business success; types of business enterprises and their evaluation for proper selection; forms of business organization, their advantages and disadvantages; problems in selection of location, and the purchase or lease of real estate and equipment; capital requirements and sources of funds; state and local regulations; purchasing; production; inventories; sales; bank and trade credit; customer credit; taxation; record-keeping; control of business risks.

2½ semester hours credit

OFFICE MANAGEMENT (OM)

Office management has developed rapidly in scope and status in response to the technical and diversified nature of the problems arising and the current trends toward the scientific approach to the solutions of these problems.

OM 1 SCIENTIFIC MANAGEMENT IN OFFICE PRACTICE

This course is intended to provide basic instruction in the tools of modern scientific management, work simplification, time study, job evaluation and merit rating; work simplification as a means of improving work methods and procedures through motion study and process analysis; time study for work measurement and the establishment of standards; and job evaluation for determining the equivalency among the several jobs as a basis for a wage and salary structure. These scientific tools will be applied to office practices. Laboratory exercises will accompany the lectures.   *2½ semester hours credit*

OM 2 OFFICE ORGANIZATION AND ADMINISTRATION

This course considers the organizational, human, physical, and operational problems encountered by the manager of the modern office. It stresses the importance of the proper place of the office management function in effective company organization; the value of proper selection techniques, supervision, adequate compensation policies, and employee relations in building up an office force with desirable attitudes and abilities. It discusses principles of efficient office layout; working conditions; the analysis of office methods and systems; work simplification; the selection and use of office machines; and common office functions. Every effort is made to use the student's own office background as a sounding board for the subject matter.   *2½ semester hours credit*

OM 3 FORM DESIGN AND CONTROL

Forms in their relationship to office systems; forms designing tools, drafting techniques, factors and principles of form design; problems of paper size and quality for specific usage; carbons, typography and printing specifications; forms housing; the design of general and specialized forms including system cards, visible file cards, tickets, bookkeeping and addressing machine forms, carbon interleaved forms, reproduction forms (hectograph and offset processes), strip accounting forms; forms control organization and administration.

(*Prerequisite, OM 4 or equivalent*)   *2½ semester hours credit*

OM 4   OFFICE SYSTEMS AND PROCEDURES

This course is devoted to the techniques of system design to most effectively record and expedite the operations of the office and/or the factory. It deals with the elements of system analysis; methods of obtaining data and recording of existing procedures; procedure charts and charting techniques; developing, testing, installing and adjusting new systems; measuring effectiveness of the system. Considerable time will be devoted to laboratory analysis of certain recognized systems and for the discussion of design problems submitted by members of the class.

2½ semester hours credit

OM 5   SYSTEMS ANALYSIS AND IMPROVEMENT

Tools and techniques of the systems analyst; the humanics of systems analysis; developing and presenting recommendations; setting up pilot operations; selling management and the workers; installing and checking the new operation. This course is conducted on the case method, using all of the tools of the systems analyst, i.e., process chart, procedure flow chart, forms distribution (flow) chart, work distribution chart, layout flow chart, reports control chart, work measurement (productivity) chart, etc. Some problems are presented at the actual location through plant visitation.

(Prerequisite, OM 4 or equivalent) *2½ semester hours cedit*

PERSONNEL AND INDUSTRIAL RELATIONS (IR)

The management of human relations in business represents one of the most challenging aspects of our industrial developments. Opportunities are unlimited for qualified persons in all phases of management with a sound understanding of the underlying principles of labor-management relations. The continuance of our American system of industrial economy demands a more thorough understanding of the principles underlying labor-management relations and their responsibilities one to the other and mutually to the public.

IR 3   PSYCHOLOGY OF GROUP DYNAMICS AND LEADERSHIP

This course involves the results of recent research in the psychology of the individual as a member of a group and the psychological aspects of group leadership involving motivation, incentives, morale and group decision procedures. The course has as its objectives the increase in group leadership skills; the development of new insights concerning the behavior of workers; and the application of these findings to improvement in training procedures.

(Prerequisite, IR 5 or its equivalent) *2½ semester hours credit*

IR 5   PSYCHOLOGY FOR BUSINESS AND INDUSTRY

Business psychology is the study of predicting and influencing human behavior in business. It provides an understanding of man's mental life, of how the individual and the group behave and are influenced in their behavior, and of how the business man may predict and control his own behavior and that of those with whom he works. The study and analysis of the student's own personal problems and behavior constitute a valuable and interesting phase of the course. *2½ semester hours credit*

IR 6   PRACTICAL TRAINING METHODS FOR BUSINESS AND INDUSTRY

Subjects covered range from principles and methods of effective "on-the-job" training to the handling of formal or informal training groups. The objective is to provide a thorough grounding in the psychology of learning; techniques of effective teaching; personality qualifications for successful training; a review of job instruction training (J. I. T.) and job relations training (J. R. T.); use of the case analysis method; role playing; training tools; visual aids; the value of example and demonstration; methods of analyzing and meeting training needs; the principles and practices of organizing and administering a training program; follow-up procedures to insure results; class projects to provide practical application of material covered in the course. *2½ semester hours credit*

IR 7   INDUSTRIAL SOCIOLOGY

The social, psychological, and biological factors are interacting forces affecting the behavior of workers. This course in the sociology of work relations attempts to study the worker in terms of his needs, desires and ambitions but also considers him as one of a group in the larger area of group dynamics. It discusses the many significant social adjustments made by the individual throughout his work-life; the sociological aspects of worker selection and placement upon industrial morale and teamwork; the formal organization of management and the unions; the strategy and tactics of union-management bargaining; occupational mobility and security; industry and society. *2½ semester hours credit*

IR 8 TECHNIQUES OF SUPERVISION

Supervision is the function of directing, controlling, and co-ordinating the combined efforts of men, machines and materials. Positions of managerial capacity involve the responsibility of supervision. This course is designed to provide basic instruction in such phases as the supervisor's responsibilities and objectives; planning the work and employee assignments; employee's attitudes toward management, equipment and materials; records and reports; improving individual performance; progress of employees; personnel relations; handling of grievances; training; administering of company policies; matters related to wages; the development of a congenial, enthusiastic community of work interest through the co-ordination of the work of all employees. *2½ semester hours credit*

IR 9 WAGE ADMINISTRATION

The course is a comprehensive study of the underlying theory of industrial wages. Specific consideration is given to job and salary analysis and evaluation; merit rating; incentive wages; wage payment plans. The importance of a sound wage structure to healthy employer-employee relations and the administration of wages through collective bargaining from the production as well as the labor relations point of view. *2½ semester hours credit*

IR 11-12 HUMAN RELATIONS

Effective handling of human problems has become a factor of vital importance to management. This course in human relations in business is the foundation to all personnel policy and offers an approach or understanding of value not only to those in personnel work but also to all persons having supervisory relationships. Subjects included for discussion are the techniques of approach to situation analysis; problems in selection; training; employee rating; change of employee status; supervision; wage policies; complaints and grievances; employee morale; labor turnover; discipline; health; safety; employee participation; collective bargaining; public relations. *5 semester hours credit*

IR 13 PERSONNEL MANAGEMENT PRACTICES

This course in contrast to IR 11-12 is specifically related to the organization, function, and procedures of the personnel department. It is concerned with such problems as the organization of the personnel department; its relationship to management; recruitment of manpower; techniques of interviewing and counselling; employee selection; testing; proper job placement; training; job analysis and evaluation; merit rating; promotion, transfer, discharge; employee publications; standards and conditions of employment; personnel forms, records, and reports. *2½ semester hours credit*

IR 15 EMPLOYMENT TESTING

Selection and placement procedures usually comprise several steps, including the interview, psychometric testing, references, etc., all of which are fitted together to form an over-all judgment. This course is concerned with tests used in business and industry to determine aptitudes, personal characteristics and qualifications for employment, proper job placement, counselling, promotion, special training, supervisory or executive potentialities. It discusses tests in terms of type and purpose, test characteristics, test construction, test interpretation, use and limitations of testing. *2½ semester hours credit*

IR 22 LABOR-MANAGEMENT RELATIONS

This course provides a basic treatment of labor economics, including the history of the labor movement and of industrial relations, with emphasis on the present period; theory of collective bargaining; effects of collective bargaining upon income of labor, employment, accumulation of capital, and national income. Policies and practices of labor and management in respect to hiring and layoffs, technological changes, wages and market position, closed and open shop, union-management co-operation, government regulation of labor relations, etc. The problem of strikes and lockouts. Public policy as to industrial relations. *2½ semester hours credit*

IR 23 LABOR LEGISLATION — UNION-MANAGEMENT RELATIONS

Government and Labor-Management Relations and the development of labor legislation. The purpose, policy and jurisdiction of the National Labor Relations Act, as amended by the Taft-Hartley Act. A detailed study of the Labor-Management Relations Act, 1947 (Taft-Hartley Act). The Fair Labor Standards Act of 1938 (Wage and Hour Law) as amended by the Portal-to-Portal Act of 1947. Consideration of the procedures, powers and limitations of the agencies administering the statutes.

(*Prerequisite, IR 22*) *2½ semester hours credit*

IR 24 LABOR LEGISLATION — STANDARDS AND CONDITIONS OF EMPLOYMENT

A course comparing and contrasting Federal and State laws which affect the worker in his daily employment by regulating minimum wages, maximum wage ceilings and related wage regulation; hours, overtime pay, and child labor. It also discusses Federal Old Age and Survivors Insurance, Unemployment Insurance, Workmen's Compensation, Veterans' Re-employment Rights, and Fair Employment Practices Acts.

(Prerequisite, IR 22) *2½ semester hours credit*

IR 25 THE LABOR AGREEMENT — NEGOTIATION AND ADMINISTRATION

The negotiation, re-negotiation, and administration of labor contracts; study of the component clauses such as union recognition and security, management prerogatives, seniority, vacations, wages, hours, working conditions; grievance analysis and arbitration procedure developed through case studies in actual labor-management relations as affected by such clauses, and the entire collective bargaining agreement and relationship.

(Prerequisite, IR 22) *2½ semester hours credit*

IR 27 LABOR RELATIONS SEMINAR

An advanced discussion of current labor-management problems such as union responsibilities, management responsibilities, the annual wage, profit sharing, criteria for wage determination, welfare programs, etc. Cases under consideration will cover problems that are timely and specific. Class limited in size.

(Prerequisites, IR 22, IR 23, IR 25) *2½ semester hours credit*

PUBLIC ADMINISTRATION (PA)

The increasing complexities of the administrative functions of government present problems requiring the application of sound business and technical knowledge. Today as never before government, through its numerous agencies and expanding control legislation, is regulating the operation and influencing the direction of business policy. Courses in this department are designed to provide practical and specialized training for the increasing number of persons planning careers in governmental service.

PA 1 AMERICAN GOVERNMENT AND POLITICS

This is an introductory survey of the constitutional principles, functions and structure of our National Government. Special reference is made to the relationship between the citizen and his government in regard to policy making in our democratic country.

2 semester hours credit

PA 2 AMERICAN GOVERNMENT AND POLITICS

This course is a continuation of the study of our National Government with a more detailed analysis of the legislative, executive and judicial relations, the role of the United States in foreign affairs and the service and control functions of the government.

2 semester hours credit

PA 3-4 COMPARATIVE GOVERNMENT

A comparative and systematic survey of modern government and politics with special emphasis on the governments of Great Britain, France and the Soviet Union. Consideration is also given to the developing postwar governments. *2 semester hours credit*

PA 5-6 ENGLISH AND AMERICAN CONSTITUTIONAL HISTORY

A study of the origin and development of the English Constitution in terms of institutions and concepts that form the background for the American Constitution. The history and principles of American constitutional law designed to give the student an understanding of case-law and the significance of the courts in the American system of government. Among the special topics covered are the power of the Supreme Court to pass upon statutes, the relation of national and state powers, civil rights, and the Commerce clause. Highly recommended for students planning to study law. *4 semester hours credit*

PA 7   AMERICAN POLITICAL PARTIES

A comprehensive analysis of the American system of politics in action. It includes the two party system, their histories and platform policies; third party and minority party movements; the group contenders for power, pressure groups and their techniques of operation; state and local politics; the electorate and its behavior.

(*Prerequisite*, PA 1-2)   *2 semester hours credit*

PA 8   AMERICAN FOREIGN POLICY

An historical survey of the foreign relations of the United States from 1775 to the present. The course is concerned with the major trends and influences, traditional policies, and actual practices in our foreign relations. One of the objectives of the course is to provide the student with a better understanding of the position of this country in world affairs today.

4 semester hours credit

PA 9   INTERNATIONAL POLITICS

The socio-economic-geographic factors affecting international relations; the State System — the origin and development; international politics as a struggle for power; nationalism; limiting factors including balance of power, international morality, international law, sovereignty; the problem of peace; international organizations, e.g., the League of Nations, the United Nations, etc.; the United States and Soviet Russia; the struggle for the minds of men.   *2 semester hours credit*

PA 10   MODERN POLITICAL THEORY

A critical study is made of the major developments in political theory, with special reference to the influence of these developments upon American politics and political institutions. Attention is paid to the modern conflict between the democratic and the totalitarian conceptions of the state.   *2 semester hours credit*

PA 21-22   UNITED STATES HISTORY

The political, social, and economic development of the United States is traced from the colonial period to the present with special emphasis upon the period since the Civil War. It marks the transition from an agricultural to an urban industrialized society and the problems incidental to our emergence as a dominant world power.   *4 semester hours credit*

PA 23   SOCIOLOGY

This course considers the factors affecting the social life of man; the contribution of biological, geographic and cultural factors in the evolution of our present society; theories of social progress; origin and values of our major social institutions; the interdependence of a well-adjusted personality and a healthy society; how our mores, customs, and family determine our prejudices.   *4 semester hours credit*

PA 24   SOCIAL PROBLEMS AND PATHOLOGY

This course treats more specifically with the major social problems as poverty, and unemployment; race antagonisms; population pressures, and mobility; family disorganization; political corruption; crime, etc. These problems are also considered in the light of the individual's adjustment to these situations and their resultants in mental defectiveness and disease, alcoholism and drug addiction, suicide, juvenile delinquency, crime, and pathologies of domestic relations.

(*Prerequisite*, PA 23)   *4 semester hours credit*

PA 25   CRIMINOLOGY

The nature and cause of crime; the criminal as a social problem; the theory of punishment as a deterrent (Should it be punishment to fit the crime, or punishment (treatment) to fit the criminal?); the individualization of treatment; social, cultural, and developmental factors affecting crime; psychiatry, social work, and religion in criminal treatment.

2 semester hours credit

PA 26   CRIMINOLOGY

Prison systems in the United States and Europe; the Pennsylvania and Auburn systems compared; the reformatory and Borstal of penology; the indeterminate sentence; probation and parole and indenture methods of treatment; police methods and practices; procedure in adult courts, juvenile courts, and in courts of domestic relations; the jury trial, its strength and weaknesses; the law of evidence; the plea of insanity.   *2 semester hours credit*

PA 31   PRINCIPLES OF PUBLIC WORKS

The administration of public works is one of the most important aspects of municipal management. This course concerns itself primarily with (1) water; its sources, uses and rates of consumption, storage facilities, distribution systems and equipment, water quality and treatment, fire services; (2) storm water drains and sewerage systems, sewage treatment and disposal; (3) incineration and waste disposal; (4) cemeteries; (5) recreation facilities; (6) high-way construction and maintenance.   *2½ semester hours credit*

PA 33-34   PUBLIC WORKS II

This course considers in detail problems of design, contracting and construction procedures, materials, equipment and cost estimating. A typical New England town is developed with emphasis on zoning, street layout, water supply, sewerage, drainage, highway construction and maintenance, recreation areas and municipal services.   *5 semester hours credit*

PA 35   MUNICIPAL ACCOUNTING I

This course introduces the applications of accounting principles to governmental account-ing. It discusses compliance with budgetary provisions, appropriations and funds; classifica-tion of revenue and expenditure accounts; preparation, presentation, adoption, and execu-tion of the budget; special budgets; balance sheets; general fund revenues and expenditures; bond funds.   *2½ semester hours credit*

PA 36   MUNICIPAL ACCOUNTING II

This course is a continuation of PA 35 and is based upon the classification and function of municipal accounts as developed by the Massachusetts Department of Corporations and Taxation, Division of Accounts. It considers the following: sinking, working capital, special assessment, trust and agency, and utility funds; general fixed assets, general bonded debt, inter-fund relationships, cash, investments, general property taxes, cost accounting, and financial reports.   *2½ semester hours credit*

PA 37   MUNICIPAL FINANCE

This course is basically concerned with the financial structure of a municipality, its sources of revenue, budget preparation, temporary and long-term financing to meet operational needs; development and analysis of debt statements to determine the community's fiscal ability to pay. The course includes discussion of the general laws governing municipal financ-ing; the money markets, their operations and effect upon municipal financing; bond issues, average maturities and coupon rates; credit ratings; tax title liens, etc.
                    2½ semester hours credit

PA 38   MUNICIPAL LAW

The course in municipal law is intended to set forth the basic functions of a municipal corporation together with an explanation of its relationship to the state, its own inhabitants and to persons with whom it deals to the end that the student may be aware of the problems encountered by municipal administrators.   *2½ semester hours credit*

PA 39   TECHNIQUES OF MUNICIPAL MANAGEMENT

The course introduces the student to a basic understanding of the city manager, his job qualifications and problems. It discusses the questions of organization and reorganization, personnel policies including job analysis and evaluation, and considers individually the several major areas of responsibility as follows: finance, budgetary control, cost accounting, debt administration; legal regulatory practices; public health and safety, sanitation; welfare and charities; public services, schools, hospitals, libraries, recreation, utilities; fire and police protection; interdepartmental and public relations; planning and research.
                    2½ semester hours credit

PA 40   STATE AND LOCAL RELATIONS

The objective of this course is to explore the areas of operation wherein the municipality has a close working relationship with the state. It includes a careful analysis of the executive, judicial, and legislative branches of the state government, emphasizing their individual func-tions, duties, and responsibilities. It is particularly concerned with the legislative processes and procedures as they affect municipal government as well as such phases of administration as state, federal and local taxation; distribution of state funds in forms of grants-in-aid, and shared taxes; state and local welfare; school aid, etc.   *2½ semester hours credit*

PA 41   PRINCIPLES OF ASSESSING

The course, based upon the general principles of Massachusetts appraising for taxation purposes, considers the organization and functions of the Assessing Department with established practices of assessment and recording of real and personal properties for purposes of taxation.   *2½ semester hours credit*

PA 43-44   COUNCIL MANAGER–PUBLIC RELATIONS

An historical development of the types of municipal government leading to the more recent city-manager form. The advantages and disadvantages of each is discussed in terms of executive administration. The course considers the municipal manager in terms of his operating relationships and responsibilities to the council and other elected boards and enters into the broader field of public relations including administrative reports and reports to the public.
5 semester hours credit

REAL ESTATE (RE)

Real Estate occupies an important position in our social economy. The courses in this department are practical in their approach, designed to provide the necessary tools for those planning careers in any of the several phases of operation within this field.

RE 1   REAL ESTATE FUNDAMENTALS

This course examines real estate's place in our social economy. The operation and forces of the market itself, and its relation to over-all public interest; it includes land economics and development, the market, building and its problems, building construction, brokerage, starting a real estate business, mortgage lending, remodeling, insurance, planning and zoning, Government Legislation — V.A. Loan Guaranty and Federal Housing Administration insurance on G.I. and non-G.I. loans.   *2½ semester hours credit*

RE 2   REAL ESTATE LAW AND CONVEYANCING

This course covers the legal processes and instruments used in controlling real estate ownership and transactions involving the acquisition, use, enjoyment and disposition of real estate and including land titles, estates, contracts, agreements of sale, deeds, mortgages and foreclosures, easements, liens, leases, landlord and tenant relations and liabilities, purchase and sale of real estate, conveyancing, wills and probate, building and zoning laws, and insurance.

(*Prerequisite, RE 1*)   *2½ semester hours credit*

RE 5   REAL ESTATE MANAGEMENT

This course offers more of a practical than theoretical approach to the relationship which exists between real estate investment and management, placing particular emphasis on the advantages and risks of investment in real estate, types of real estate investments, the workings of the real estate operator with regard to exchange of real estate and speculation, financing of real estate purchase and development, the relation of investor to manager and broker, real estate management as a business, the organization of a management department in a brokerage firm, management policies, rent and rental problems, the fundamentals of apartment house management and co-operative apartments.

(*Prerequisites, RE 1, RE 2, A 13-14*)   *2½ semester hours credit*

RE 6   OPERATING A REAL ESTATE BUSINESS

For the person who is about to enter the real estate brokerage business, and as a refresher course for those already established in the business, this course offers new ideas from authoritative sources, as well as general principles and practices of the business. Included in the course are lectures and discussions on what real estate embraces, getting started in the real estate business, establishing an office, pitfalls to avoid, the art of selling, the sale from start to close, land subdivision, renting and leasing, women's field in real estate, hiring and training salesmen, advertising, publicity and promotion, and compensation for brokers and salesmen.
2½ semester hours credit

RE 7 REAL ESTATE FINANCE

An advanced course dealing with the current methods of financing real estate, especially designed for realtors, bankers, attorneys, appraisers, as well as students pursuing the real estate program. It considers banking systems, instruments of finance, including discussions of long-term leases and bond issues; techniques of mortgage lending; financing various types of real estate; the effect of income taxes on financing. The functions of the real estate broker and the government financing agencies form a base for this course. They are supplemented by discussions pertaining to the influence of federal financing institutions upon the field of real estate as a segment of our economy.

(Prerequisites, RE 1, RE 2)   *2½ semester hours credit*

RE 9 REAL ESTATE SALES AND ADVERTISING

The selling of real estate calls for specialized applications of the principles of selling and advertising, basic to which are the techniques of property listing; the securing, classifying and analyzing of prospects; methods employed in selling the various kinds of residential, business and industrial properties; creative selling; trading and exchanging; financial aids in selling; the economics and techniques of advertising; women in the field of real estate sales.

(Prerequisites, RE 1, RE 2)   *2½ semester hours credit*

RE 11 REAL ESTATE APPRAISAL — RESIDENTIAL PROPERTIES

This course is designed to provide the student with the basic knowledge and tools necessary to enable him to appraise residential properties. Study is made of valuation concepts, the purposes of appraisal; the sources of, collection, and application of data used to prepare appraisals; the use of tables, residual techniques; special purpose properties; the summation and final estimate of value, and the writing of appraisal reports; preparation and presentation of expert court testimony.

(Prerequisites, RE 1, RE 2)   *2½ semester hours credit*

RE 13 REAL ESTATE APPRAISAL — COMMERCIAL AND INDUSTRIAL PROPERTIES

Presented in this course is the analyzing of business neighborhoods, the special appraisal functions, as applied to the following commercial and industrial properties: various types of business properties, retail store properties, heavy and light manufacturing properties, warehouse and waterfront properties, special purpose properties, banks, indoor and outdoor theaters, garages and gasoline stations, office buildings, combination store and offices, hotels, apartment buildings; the appraisal reports.

(Prerequisites, RE 1, RE 2, RE 11)   *2½ semester hours credit*

RE 15 CITY AND REGIONAL PLANNING

Effective planning for both individual business enterprise and for public policy determination is dependent upon a sound understanding of economic land utilization. This course applies these principles as it continues with a discussion of the principles and methods of planning for urban areas; the use of surveys for coordinating local and regional facilities; highways and transportation systems; proper location of public buildings and facilities, residential, business and industrial areas; population studies to forecast growth patterns; zoning and building code regulations; public utilities, etc.   *2½ semester hours credit*

RE 17 SMALL HOME CONSTRUCTION AND ESTIMATING

A practical and authoritative presentation of information invaluable to the contract builder, the real estate operator or the owner-builder regarding residential construction, remodeling or repair.

The course deals specifically with the types of house architecture; house styling; modern subdivision methods; construction details from foundation to roof; selection, scheduling and specifications of materials, equipment and services; plans and plan reading; construction specifications; estimating costs of materials, labor, etc.; budgeting finances.

       2½ semester hours credit

RETAILING (R)

Retailing occupies one of the major steps in the important field of distribution. Rapid changes in retail merchandising practices create complex and difficult problems, making a knowledge of modern control methods necessary.

R 1-2 RETAIL STORE MERCHANDISING

This course presents the fundamental principles of retail store merchandising, including purchase planning, pricing, markups and markdowns, merchandise inventories, turnover, merchandising policies, publicity budget and plans. Under the function of buying, particular emphasis is given to the merchandise organization; determining customer demands; sources of information and supply, buying plans; market representation and resident buying; meaning and computation of markup, discounts, cash terms, open-to-buy and typical department profit and loss statements.   *5 semester hours credit*

R 3 RETAIL STORE ADVERTISING

This course is devoted to the study of the elements of retail advertising. The various media used by retailers are considered with drill in the preparation of effective retail copy. A study is made of institutional, straight merchandise and sales copy as exemplified in current advertising of important retail concerns. The principles of layout receive attention as well as the mechanics of production, including art work plates, typography, and printing. The aim is to furnish a practical foundation fitting students for a creative career in retail advertising.

(Prerequisite, D 10)   *2½ semester hours credit*

R 4 MERCHANDISE DISPLAY FOR SALES PROMOTION

Display as a tool of sales promotion; the function and organization of the display department in the promotion of merchandise through interior and exterior displays; selection and preparation of merchandise for display; the use of display fixtures; creating display arrangements and determining most effective locations; store traffic; impulse buying; display problems of the small stores; seasonal backgrounds; color and illumination effects in window and case displays; planning and budgeting to co-ordinate with store merchandising and management policies.   *2½ semester hours credit*

R 5 RETAIL STORE MANAGEMENT

Development of modern retail organizations, including smaller and larger retail stores, store location and layout, wage payment methods, selling services, receiving and marking procedures, mail and telephone orders, adjustments, delivery of merchandise, retail accounting and control, and store protection and maintenance.   *2½ semester hours credit*

SECRETARIAL (S)

Today, more than ever, with the increased tempo of defense production, business and industry are looking toward qualified women to assume positions of administrative responsibility. The combination of proficiency in the secretarial sciences with training through specialized courses related to their fields of employment considerably enhances their value and provides the avenue for advancement into positions of major importance.

S 1 SHORTHAND I

Basic techniques of Gregg system with special emphasis on drills in the use of brief forms and abbreviations; spelling, punctuation, and letter practice including a large vocabulary of business terms. Transcription is introduced early in this course and rapid writing stressed through practice dictation material.   *2½ semester hours credit*

S 2 SHORTHAND II

Continuation of more advanced and difficult letters than those in beginning course, which will include dictation relating to specific fields in business and industry; constant check-ups on transcription speed; broader vocabulary development.

(Prerequisite, S 1 or equivalent)   *2½ semester hours credit*

S 3 TYPEWRITING I

Mechanical operations of the typewriter; mastering the keyboard; development of correct typewriting technique; proper stroking, rhythm, centering, tabulating; special finger and word exercises; speed tests and hints for developing both speed and accuracy in typewriting. As the semester progresses, elementary transcription will be introduced.

2½ semester hours credit

S 4 TYPEWRITING II

A continuation of S 3, with emphasis on developing typewriting speed; familiarization with carboning, stenciling, including mimeograph, hectograph, and multilith processes; advanced tabulation, rough draft and copy work; letter writing, and direct machine dictation, including audograph and ediphone. Each student is required to complete an outside typewritten project.

(Prerequisite, S 3 or its equivalent) *2½ semester hours credit*

TRANSPORTATION AND TRAFFIC MANAGEMENT (T)

The rapid changes in several phases of the transportation industry are creating many entirely new concepts in the methods and economics of business operation. The transportation courses below are designed to present a practical approach to the basic principles and practices of current procedures and operations.

T 1 TRANSPORTATION PRACTICES

The importance of transportation in the American economy; a comparative evaluation of the various available transportation services from the point of view of cost, total time in transit, reliability and geographical coverage, including movement of freight by rail, motor, water and air carriers, freight forwarders, parcel post and express as well as combinations and modifications of each; classification of freight; rules of classification; basic studies in rates and tariffs; freight claims, transportation insurance and warehousing. The basic factors involved in cost control are introduced. *2½ semester hours credit*

T 3 TRAFFIC MANAGEMENT

The application of the principles of transportation and the principles of management to industrial activity. The traffic manager in the carrier organization; comparative advantages of different modes of transportation; selling the transportation service; government regulation and traffic management; use of tariffs; documentation; miscellaneous charges, rules and regulations. The industrial traffic manager, duties and qualifications; the industrial traffic management department; filing of claims, handling of freight; traffic management objectives.

(Prerequisite, T 1 or equivalent) *2½ semester hours credit*

T 4 ADVANCED TRAFFIC MANAGEMENT PROBLEMS

This course applies the principles of transportation and the principles of traffic management to the solution of a series of actual and typical problems in industrial traffic management and carrier traffic management, and export and import procedure. The problems embody the application of the precepts of regulation and rate selection, as well as detailed analysis of comparative services and their costs.

(Prerequisites, T 1, T 3) *2½ semester hours credit*

T 5-6 INTERSTATE COMMERCE COMMISSION PRACTICE AND PROCEDURE

A course designed to acquaint management levels in the transportation industry and in the industrial traffic departments of general industry with the responsibilities applicable to the regulation of transportation by the Federal Government; who must execute these responsibilities; the procedure by which they are carried out; history and content of Interstate Commerce Act and its impact upon all industrial activity; purpose and function of the Interstate Commerce Commission; training and preparation for the Interstate Commerce Commission Practitioners' Examination, including a study of important cases under the Commerce Clause of the Constitution; administrative law and procedure; ethics and general rules of practice.

(Prerequisite, T 1 or its equivalent) *5 semester hours credit*

T 7-8 RATES AND TARIFFS

Technical treatment of tariff construction and use; structure of rates; the general rate level; procedure of filing; deviations from published tariffs and schedules; classification, exceptions, commodity rates, miscellaneous departures; changes in tariffs and classifications; the economic aspects of transportation rates.

(Prerequisites, T 1, T 5-6)   5 semester hours credit

T 9 COMMERCIAL WAREHOUSING

Commercial warehousing has become an important and integrated element in the transportation of freight. This course stresses the possibilities and procedures for reducing the over-all transportation and distribution costs while providing improved service through intelligent selection and utilization of commercial warehousing facilities. It includes types of commercial warehouses and the function of each; commercial warehouse receipts as a method of short-term industrial finance; commercial warehousing as a natural economic method of price stabilization and market control; the legal aspects of commercial warehousing.

2½ semester hours credit

T 11 MOTOR CARRIER OPERATIONS

Nature and characteristics of the motor carrier industry; types of motor carrier operations common, contract, private, as well as local and over-the-road; regulation under the Motor Carrier Act of 1935; internal organization and administration, traffic management, terminal and garage operation; problems of revenue and cost, capital structure and financial management, selection, financing, maintenance, and replacement of equipment; industrial relations; safety and insurance; freight loss and damage claim; accounting, taxation and cost allocation; tariffs and classification; sales and public relations; trade associations and carrier rate conferences.

2½ semester hours credit

T 13-14 MOTOR CARRIER ACCOUNTING

Determination and allocation of revenue and cost in the motor carrier industry, including cost control for the benefit of management and cost allocation for regulatory purposes; capital structure and depreciation; office systems and procedure for the motor carrier; general record keeping for internal revenue as well as transportation regulation purposes, federal and state.

5 semester hours credit

T 15 FREIGHT CLAIMS FOR LOSS AND DAMAGE

This course presents the practical procedure as well as the legal basis for handling loss and damage claims, including the bill of lading as a contract, development of common carrier liability; duties of consignee and carrier with regard to acceptance of damaged freight; preparation, filing and prosecution of freight claims; statute of limitations; damages, usual and unusual, as well as direct and indirect.

(Prerequisites, T 1, T 3)   2½ semester hours credit

T 17 ADVANCED TRANSPORTATION ECONOMICS

This course looks beyond the mechanics of traffic management toward the more complete professionalization of the transportation executive, including the part played by transportation in the production process and the marketing process; transportation and the division of labor; the effect of transportation rates on prices and on the location of industry; carrier rate structure; the philosophy of public utility regulation; lawfulness and unlawfulness of carrier rates.

(Prerequisite, Ec 1-2)   2½ semester hours credit

T 21 OCEAN TRANSPORTATION

This course includes the principles and practices of ocean transportation of freight; common, contract and tramp carrier operations; methods of calculating and applying rates and charges in ocean transportation; cargo control; customs procedures; free zones; through movement from and to inland points; port authority operation and port development; legal aspects of ocean freight movement.

2½ semester hours credit

T 23 AIR CARGO TRANSPORTATION

This course deals with the chronological development and scope of the air cargo industry, including air mail, air freight, and air express. It considers the characteristics of aircraft as cargo carriers; practical applications of the airlines' official tariffs; the competitive position of air cargo transportation in the over-all transportation system; legal aspects of air cargo transportation; the effects of air transportation on our economy.

2½ semester hours credit

T 25 TRANSPORTATION INSURANCE

This course discusses the risks in the transportation industry for which insurance coverage offers protection. It includes the consideration of carrier risks such as public liability in the event of loss of life or personal injury, loss or damage to property, workmen's compensation; carrier risks such as cargo protection while freight is in transit under common carrier liability; coverage from the shipper point of view with respect to in-transit all-risk floater insurance; rights and liabilities of carrier and shipper in the event of loss or damage; specially designed insurance coverages for unusual transportation conditions. *2½ semester hours credit*

BUSINESS READINGS

The two courses in Business Readings are designed to broaden the student's acquaintance with selective writings in the field of business and to introduce him to the real pleasure and values that come from such reading. There are no required lectures for these courses, each of which carries two and one-half semester hours credit and for which a charge of ten dollars is made.

Each of the Business Readings represents the equivalent of one hundred (100) hours devoted to reading and completion of the report. In general, one thousand (1000) pages of reading are represented in each report.

At the beginning of the Upper Middler and the Junior years, each degree candidate registers for a Readings course and is furnished a list of titles from which he makes selections for readings in accordance with the course requirements. Written reports are submitted on these readings, and are due on or before registering for classes the following year.

5 semester hours credit

THESIS

BACHELOR'S DEGREE THESIS

Each candidate for the B.B.A. Degree may submit a thesis or the Business Readings reports. The conditions to be fulfilled in connection with a thesis are:

1. The selection of the subject, preparation of the outlines, and the collection of data must be worked out in accordance with the requirements of the Committee on Theses.

2. Two typewritten copies of the completed thesis must be presented to the Dean or the Director in the Divisions not later than March 15 of the year in which the candidate expects to graduate.

3. The thesis is expected to meet the equivalent of the work required in a full-year course. It is expected to give evidence that its writer has made a thorough study of the subject or problem selected, that he has marshaled the data in a businesslike manner, and has given evidence of his ability to reach sound and reasoned conclusions, and to present his findings in clear and convincing terms.

OCCUPATIONS (O)

The School considers that the knowledges, skills, and experiences acquired in the full-time employment of its students are the equivalent in many respects to the work carried on in a laboratory. For this reason all members of the three upper classes who expect to qualify for the Bachelor of Business Administration Degree must meet the occupational experience requirements listed below.

In order that this occupational experience may have the maximum educational value, the School maintains a Department of Vocational Guidance and Placement under the supervision of a competent Director. It is the responsibility of this Department to assist those students:

 a. Who need advice and guidance about employment in business;

 b. Who are unemployed and need placement service, and

 c. Who are already employed but need to change their present employment connections in order to obtain the greatest possible benefit from their training and experience.

There is no tuition charge for the occupational courses listed below, even though they are required for the degree. Furthermore, all services of the Department of Vocational Guidance and Placement are without charge to the student.

O 1-2   ELEMENTARY OCCUPATIONS

In this course students are required to meet with the Director of Vocational Guidance and Placement in groups or individually as he may direct, and to submit in the Upper Middler year a complete and detailed record of their employment for the college year. This report is one factor in evaluating the occupational experience credit of the student.

10 semester hours credit

O 3-4   INTERMEDIATE OCCUPATIONS

A continuation of O 1-2. Continuing guidance under the supervision of the Director of Vocational Guidance and Placement. Consideration of psychological and economic factors affecting vocations; vocational objectives. A complete report of the employment of the Junior year is required before the beginning of the Senior year.   *10 semester hours credit*

O 5-6   ADVANCED OCCUPATIONS

A critical consideration of the student's present employment in the light of present-day occupational trends. Individual conferences with a view to vocational adjustments, if deemed desirable. A complete report of the employment of the Senior year is required, which must be presented in person to the Director of Vocational Guidance and Placement by the middle of the final semester.   *10 semester hours credit*

School of Business

Administrative Policies

Requirements for Admission

All applicants whose credentials are approved by the Committee on Education, and who are admitted for degree or other programs, are classified as regular or conditioned students.

Regular Students

Applicants for admission as regular students must present evidence of the completion of an approved secondary school course, or the equivalent 15 units.*

Conditioned Students

Applicants who do not meet the requirements for admission as regular students may be admitted as conditioned students provided they present satisfactory evidence of ability to profit by the work of the School.

Conditioned students may remove their admission conditions and be re-classified as regular students by using *a*, *b*, *c*, or a combination of *a* and *b*.

a. By applying courses which they have completed in the School of Business or in another approved college or university at the rate of one unit for each two and one-half semester hours. A course cannot be credited both for the removal of admission conditions and for the degree.

b. By applying units for work completed in an approved secondary school, or for work certified by an accredited certifying agency.

c. By action of the Committee on Education based upon all factors affecting the achievement and ability of the student in the School, when the student shall have completed the first thirty semester hours of work in his program; provided this work shall have been completed in not less than three years of attendance and with an average grade of not less than 70%. All conditioned students are required to take prescribed aptitude tests during the first year of attendance. These tests, for which no specific preparation can be made, are designed to test intellectual capacity and general fitness for college work rather than preparation in the specific subject matter of a secondary school program.

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*A unit represents a year's work in any subject in any approved secondary school constituting approximately a quarter of a full year's work, or the equivalent. A four-year day high school course is regarded as representing at least 15 units of work, or 3 units in junior high school and 12 units in a three-year senior high school.

Registration

Before attending classes, students must report to the School Office for registration. Registrations will be accepted beginning July 1st for the following School year. Applicants are requested to register during the summer months to lessen the congestion during the opening week. No student will be allowed to register for any course after the second session without special permission from the Dean.

A schedule of classes may be obtained by applying at the School Office.

Advanced Standing

Advanced standing credit in the School may be obtained in one or both of two ways as follows:

By Transfer of Credit. Subject to the approval of the Committee on Education, credit may be given for work completed in other approved schools, colleges and universities. An applicant desiring credit by transfer should indicate his desire at the time of filing his application for admission. The applicant should instruct the Registrar of the institution of previous attendance to mail an official transcript direct to the School of Business indicating honorable dismissal, courses completed, credits and grades. A copy of the catalog of the institution from which the transfer is sought should accompany the application for admission.

By Examination. 1. For credit: No advanced standing credit is awarded except for work previously completed in courses comparable to those offered in the School of Business. Credit may be disallowed for work previously completed due to the remoteness of the time of study. These applicants, however, will be granted the privilege of taking an examination for credit.

2. For placement: Applicants having completed three years of bookkeeping in high school may petition the privilege of taking an examination for placement. Satisfactory achievement will entitle them to register for Intermediate Accounting without, however, any advanced standing credit. Applicants who, as a result of previous training and experience, may be considered to possess sufficient knowledge of a subject will be allowed the privilege of taking a special examination in particular courses. No credit will be allowed but they will be granted the privilege of substituting another course.

The grade of 75% must be obtained in examinations for placement or for credit.

Residence Requirement

Every candidate for the B.B.A. or Associate Degree must fulfill the residence requirement. The residence requirement is defined as the taking and satisfactory completion in the School of Business immediately preceding graduation of 30 consecutive semester hours of work in courses plus the requirements in Business Readings and Occupational Experience; with the further provision that at least 10 of the 30 semester hours must be in the candidate's major field.

In the case of students who for causes beyond their control move outside of the reasonable commuting area of the School, and who have completed 75 or more semester hours of credit in courses, the Committee on Education will entertain a petition to allow them the privilege of completing their degree requirements at some other approved school. Under no circumstances will a degree be awarded to any student who has completed less than 30 semester hours of credit in courses in the School of Business.

Students attending certificate programs must complete in residence the full semester hour requirements of the programs in required courses or substitutions approved by the Dean.

Degree Requirements

The Degree of Bachelor of Business Administration is awarded with specification corresponding to the major field in which the student is studying. It can be completed by attending on a program of three evenings per week over a six-year period. This period, however, may be shortened by attendance during the Summer Sessions. The basic requirements are:

	Semester Hours
Required and Supporting Courses	90
Business Readings or Thesis	5
Occupational Experience	30
Total Requirements for the Degree	125

The Associate Degree (with specification) requires a total of sixty (60) semester hours of credit selected from the *required* courses listed in the specific curriculum, and subject to approval of the Dean.

Graduation with Honors

Honors are based upon the excellence of the work performed by the students in the School. Three honorary distinctions are conferred upon properly qualified candidates for the bachelor's degree upon graduation:

Highest honors to those who have completed all work with an average of 95%.

High honors to those who have completed all work with an average of 90%.

Honors to those who have completed all work with an average of 85%.

These honors are subject to further conditions as follows:

To be entitled to honors a student must have completed a minimum of two full years of study in the School.

Courses credited by advanced standing whether by transfer or by examination will be eliminated in determining honors.

School of Business

General Information

Class Sessions

Classes are held each evening, Monday through Friday, and on Saturday morning. *The normal schedule for students pursuing a degree, title, or certificate program is three courses a week. Students may arrange their schedules so as to attend classes one, two, or three sessions a week depending upon the number of subjects taken.* Students interested in the schedule of classes should apply to the school office.

Attendance

The limited amount of time devoted to each subject and the rapid rate of progress in covering the essential content of a course make it highly desirable that students be present at every session. Because of the importance of regular attendance and its bearing upon the quality of scholarship, the policies governing attendance are:

Students must attend 70% of the lecture sessions to be eligible to take the final examination.

Attendance credit is granted only when the student is in attendance at least three-quarters of the class period. Three separate absences of less than 30 minutes each constitute one complete absence unless such partial absences are canceled by satisfactory excuses.

Outside Preparation

It is expected that students will devote on the average two hours to preparation for each hour spent in the classroom. A student carrying a normal program of three courses a week will, therefore, be expected to devote to outside preparation an average of eleven to twelve hours a week. Some courses require more time for preparation than others.

Notify the Office Immediately

Of change of address.

Of withdrawal from any course — otherwise the fee for that course will be charged.

Of withdrawal from the School, giving date of the last session attended.

Term Tests

Two one-hour tests are regularly scheduled in each semester, usually on the sixth and twelfth sessions. These tests are regarded as part of the term or course work. A student who, for justifiable reasons, fails to take a term test may be allowed one make-up privilege. The registrar will assign the time and place. A fee of $3.00 is charged for each make-up test.

Regular Examinations

The general policies governing regular examinations are:

A final examination will be held at the end of each course unless an announcement to the contrary is made.

The minimum passing grade in a regular final examination is D.

Students who, for justifiable reasons, are unable to take a final examination will receive a grade of "incomplete" and may be allowed the privilege of a make-up examination. This examination will be considered as the original examination for grading purposes.

The student who has received a passing mark in a final examination and in a course may not take another examination for the purpose of raising his grade unless he repeats the course in its entirety.

Condition Examinations

The following policies govern re-examinations:

Permission for taking a make-up examination is dependent upon the quality of the work which the student has done throughout the course and is a privilege which the Committee on Education may grant to students who have received an E grade or an incomplete (Inc.).

The condition or make-up examinations are given on specified dates. Students will be notified by the School Office of the specific dates of each examination.

Only one make-up examination in any given subject is allowed for the purpose of removing a conditional failure.

A make-up examination for purposes of removing a condition or an incomplete grade must be taken within the next School year. In such cases students may take either the examination at the condition examination period or the final examination when next given if within a period of one year. A fee of $5 is charged for each School of Business examination taken out of course.

A minimum grade of 65% is required on each make-up examination unless a higher minimum is specified.

Whatever grade the student obtains on the make-up examination is credited as the final examination grade, but in no case can the final grade in the course be more than 70% except in the case of students who take the exam as an original to clear an "incomplete."

Marks and Credits

The following system of grading is in use:

Superior Work, A; Above Average Work, B; Average Work, C; Lowest Passing Grade, D; Unsatisfactory Work, E; Failure, F; Incomplete, Inc.

Students receiving an E, or unsatisfactory work grade, in an examination or as a final grade in the course, may remove the unsatisfactory grade by taking a make-up examination when it is next given, or at the time of the conditional examinations in September. The minimum passing grade of 65% is required on the make-up examination, unless a higher minimum is designated. In no case will a student taking a make-up examination be allowed more than a C for a final grade even though a higher grade may be obtained.

Students receiving an F grade in a course must repeat the course in its entirety including term work, examinations, and attendance.

The policy is followed of mailing all grade and status reports to students instead of issuing these reports at the School Office or over the telephone.

A passing grade in a final examination as well as a passing final grade in the course is necessary in order to receive credit in the course.

Credit for one-half of a full-year course is not generally given, and in any event only upon approval by the Dean in advance of beginning the course.

In order to qualify for a degree, title or a certificate, the student must maintain a general average of C for the entire program. This is not interpreted to mean that each course must be passed with a grade of C, but that the average of all courses must be at least C. Grades of courses credited by transfer or by examination are not included in computing averages.

Probation and Discipline

The Committee on Education, in dealing with students whose work in the School may be unsatisfactory, or whose conduct is such as to make it inadvisable for them to continue as members of the student body, considers each case upon its individual merits. The following general principles are kept in mind in handling such cases:

Students whose scholarship in any given year is unsatisfactory may be dropped from the School or may be placed on probation with the privilege of spending a year in review.

When a student is placed on probation, the probation is formally imposed for a definite time and can only be extended by approval of the Committee on Education.

This Committee has the authority to dismiss from the School or place on probation at any time or to strike off from the list of candidates for the degree any student whom it may deem unworthy either on account of unsatisfactory scholarship or for any great defect of conduct or character. The Committee may ask any student to withdraw from the School who is obviously out of sympathy with the aims and ideals of the School.

Classrooms and Libraries

The classrooms are furnished with modern equipment and are thoroughly adapted to evening school work. Improvements in classroom facilities are constantly being made to meet the needs of the student body.

In connection with the General Library of the University in Boston a special section is devoted to books on business subjects. In addition, the leading trade and business magazines are available for student use. Additions are constantly being made to the business section of the Library in recognition of the new demands for business education and research. The reading rooms of the Library are open Monday through Friday from 8:45 A.M. to 7:30 P.M. They close at 12:00 NOON on Saturdays and are not open Sundays and holidays.

All members of the School are entitled to the privilege of using the Boston Public Library including the Business Branch at 20 City Hall Avenue.

Textbooks and Supplies

The Northeastern University Bookstore is a department of the University and is operated for the convenience of the student body. All books and supplies which are required by the students for their work in the University may be purchased at the Bookstore situated in the basement of Richards Hall. In addition, the Bookstore also carries a large number of general supplies.

Student Council

The social and extracurricular life of the School is in charge of Student Councils consisting of representatives from each class or school group. In addition to arranging for occasional social affairs, special lectures, and meetings, the Council represents the interests of the student body. The faculty and the officials advise with the Council in regard to School policies.

Honor Fraternity

Sigma Epsilon Rho is the honor fraternity in the School of Business. Its purposes are:

To promote acquaintance and good fellowship among those men who have attained highest scholastic standing in the School.

To stimulate the student body to higher scholastic accomplishment through the bearing, influence, and work of these selected men.

To develop methods of mutual improvement and advancement among the members of this fraternity.

To support high moral, professional and scholastic ideals.

Only honor graduates or seniors with honor standing at the end of the junior year are eligible for admission to the fraternity. Admission is by invitation after nomination by the school faculty.

An outstanding business book is awarded each year by Sigma Epsilon Rho Fraternity to the highest ranking student for that year in each of the Sophomore, Lower Middler, Upper Middler, and Junior classes. Students will receive the award only in the event that they enroll for the subsequent year.

School of Business

Tuition, Fees and Scholarships

Tuition and fees are not transferable and are refundable only as stated under "Refund of Tuition."

Checks and drafts for all charges are to be drawn to the order of Northeastern University.

There are no auditors or auditor's rates in the School of Business.

Matriculation Fee

The University matriculation fee of $5 must accompany the initial application for admission to the University. This fee is non-refundable.

Tuition

Tuition for all credit courses is charged at the rate of fourteen dollars ($14.00) per semester hour of credit. Charges for registration and tuition for special courses are at the rate and on the basis of payment specified for each course.

Tuition for degree or certificate candidates for all credit courses is charged on the semester basis payable at the beginning of each semester. As a convenience, however, and unless otherwise requested, the tuition each semester is payable in two (2) installments; the second installment is payable on November 15 and March 15 in the first and second semesters respectively.

Tuition for an unclassified student registered in a special course is charged for the entire course and is payable in a single payment at the beginning of the course unless otherwise arranged.

Occasionally situations develop — usually beyond the control of the student — which make it difficult to meet the payments in the manner outlined above. Under such circumstances the student is advised to discuss his problem personally with the Student Accounts Office where one of the budget plans or a deferred payment agreement may be worked out. Such arrangements should be made before the end of the first week of the semester or within one week of the date of registration if the student enters late. Failure to take immediate action will result in a late payment fee.

Tuition Budget Payment Plans
Schedule of Tuition Payments Calculated on a Semester Basis

		PLAN A *Three-Course Load*	PLAN B *Two-Course Load*	PLAN C *One-Course Load*
Payment Dates		Payments	Payments	Payments
	Sept. 15	*$27	*$22.00	
First	Oct. 15	20	12.50	Regular
Semester	Nov. 15	20	12.50	Quarterly
	Dec. 15	20	12.50	Payment
	Jan. 15	20	12.50	Plan
	Feb. 1	*27	*22.00	
Second	Feb. 20	20	12.50	Regular
Semester	Mar. 15	20	12.50	Quarterly
	April 10	20	12.50	Payment
	May 1	20	12.50	Plan

*Includes a non-refundable service charge of $2.00.

Tuition Underwritten by Employers

An increasing number of companies are underwriting in part or whole the cost of tuition of students in their employ. In such cases the student must furnish at the time of registration, or immediately thereafter, a purchase order covering his registration or a statement from an officer of his company certifying that the company is underwriting the tuition.

Late Payment Fee

Bills for tuition and fees are payable on or before Saturday of the week of issuance. A Late Payment Fee of $2 is charged for all students failing to comply unless special payment arrangements are approved by the Student Accounts office.

Courses in Other Departments of the University

School of Business students assigned to courses in other departments of the University are charged the tuition rates and other fees effective in the departments to which they are assigned.

Late Registration

Students are urged to register well in advance of the opening of the semester, since any student who registers after the first week of classes of the School term is charged a Late Registration Fee of $5.00.

General Fees

A fee of $3 is charged for each make-up test, $5 for each conditional examination or advanced standing examination. This fee must be paid on or before the date of the examination.

A fee of $10 is charged for each of the Business Readings courses. Payment is due upon approval of selected readings. This fee applies only to those who elect to submit Business Readings in lieu of a thesis, and is payable ordinarily during the Upper Middler and Junior years.

A thesis fee of $20 is required of all degree candidates who elect to write theses. This fee is payable upon presentation of the thesis which is due not later than March 15 of the year in which the student expects to receive the degree.

The University graduation fee, charged to those who are candidates for the Bachelor or Associate degree is $20, payable on or before May 1st of the year in which the student expects to graduate.

Expense for Books and Materials

Students purchase their own textbooks and working materials. The cost varies according to the subjects for which the student is enrolled. The average cost for a normal program of three subjects is about $15, with a maximum of approximately $25. The textbooks for single courses range from $3 to $6.

General Financial Information

Checks should be drawn payable to Northeastern University.

Students are not permitted to attend class sessions or take any examinations or tests until they have paid their tuition fees or have made satisfactory arrangements for payments.

Students will not be advanced in class standing, or permitted to re-enroll in the University, nor will degrees be conferred until all financial obligations to the University have been met.

No certificate of honorable dismissal will be issued to any student who has not fully met his financial obligations to the University.

Refund of Tuition

Requests for refunds must be made at the time of filing the Application for Withdrawal at the School Office. If the withdrawal notification is sent in by mail, the refund should be requested in the letter with reasons which necessitate the withdrawal. *No refunds will be granted to a student who voluntarily withdraws* or who has attended more than five weeks of the term for which payment has been made.

Refunds of tuition will be considered only in the following instances:

1. If, because of illness, a student is compelled to withdraw before the fifth week of the term, or
2. If a student who is regularly employed is sent out of town permanently by his employer, or
3. If the hours of employment of a student who is regularly employed are changed so as to make it impossible for him to continue in attendance, or
4. If a student is inducted into military service.

The Committee on Withdrawals will consider requests for tuition refunds only on the following bases:

1. That the application for withdrawal be made immediately after the student ceases attendance.
2. The request for refund is accompanied by an *acceptable* physician's certificate in the instance of illness, or by an *acceptable* employer's certification in the instance of a change in place or hours of employment.
3. Evidence of induction into military service.

For cases complying with the above, partial refunds on tuition for the semester may be allowed according to the following schedule:

	Refund to Student on	
Petition for Withdrawal Filed Within	*Regular Term*	*Summer Term*
One Week	80 per cent	80 per cent
Two Weeks	80 per cent	60 per cent
Three Weeks	60 per cent	40 per cent
Four Weeks	40 per cent	20 per cent
Five Weeks	20 per cent	0 per cent
After Five Weeks	0 per cent	0 per cent

The above does not include fixed or non-refundable fees or laboratory fees, for which there is no refund allowed.

The official "Application for Withdrawal" form may be obtained in the School Office. All refunds are made through the Student Accounts Office of the University. The refund procedure in such cases takes from three to four weeks. A check is mailed direct to the student for any refund to which he is entitled.

Scholarships, Awards, and Loan Funds

The following scholarships and awards are available to students enrolled for a normal schedule of fifteen or more semester hours of class work who are pursuing a degree or title program in the School of Business in Boston. One-fourth of the scholarship is applied to the tuition of the recipient at each quarterly payment.

School of Business Honor Awards

A half tuition scholarship award is made each year to the highest ranking student of that year in the Junior, Upper Middler, Lower Middler, Sophomore and Freshman classes who re-enrolls the following year for a normal schedule of study.

A quarter tuition scholarship award is made each year to the second highest ranking student of that year in the Junior, Upper Middler, Lower Middler, Sophomore and Freshman classes who re-enrolls the following year for a normal schedule of study.

To be eligible for either a half or a quarter tuition honor award, a student entering the School with advanced standing credit, except by examination, must have completed at least thirty semester hours of classroom work at the time the award is made.

The Clarkson–Alumni Scholarship

This scholarship, made available through the generosity of the Alumni Association of the School of Business, is in memory of George S. Clarkson, a member of the Class of 1914 and an instructor in Accounting for many years. This scholarship, which is indeterminate in amount, is granted to the student who obtains the highest cumulative average in one of the Accounting curricula at the close of his Junior year. To be eligible, the student must have completed thirty semester hours of credit in residence in Accounting courses. If he is eligible for an award of greater monetary value, the Clarkson-Alumni award will be made to the next highest ranking student who is eligible. To be eligible for this scholarship the student must pursue a normal schedule the following year.

Dean Russell Whitney Memorial Scholarship

Alpha Chapter of the Pi Tau Kappa Fraternity sponsors an annual tuition scholarship in memory of former Dean Russell Whitney. The award consists of a half tuition made available to the man in the Junior Class of the School of Business whose qualities of leadership and influence among his fellow students, whose strength of character, whose record of scholarship and broad achievement mark him as outstanding. The award is made available to the student in his Senior year. To be eligible for this scholarship the student must pursue a normal schedule during his Senior year.

Kappa Tau Phi Scholarship

This scholarship award of one quarter tuition is made available by the Kappa Tau Phi Sorority. It is granted annually to the woman student who ranks highest in her class at the end of the Sophomore year unless she is eligible for an award of greater monetary value, in which event the award will be made to the highest ranking woman student who is not eligible for such an award. To be eligible for this scholarship the student must pursue a normal schedule the following year. In determining this award grades of all courses completed in the Freshman and Sophomore years shall be considered.

Traffic Club of New England Scholarship

The Traffic Club of New England provides four scholarships annually for persons employed in the field of transportation and traffic management. Each scholarship covers tuition, books, and incidental expenses involved in the two courses, "Transportation Practices" and "Traffic Management." The objective of the scholarship is to introduce four new persons annually to education in the field of transportation and traffic management, after which it is assumed that they will continue for the complete program at their own expense. Two students each will be selected from carrier traffic departments and industrial traffic departments annually. The scholarship proposals are administered cooperatively by the Scholarship Committee of the Traffic Club of New England under the permanent chairmanship of Prof. Emeritus William J. Cunningham of Harvard University and Prof. Frank M. Cushman, Director, Transportation and Traffic Management Institute, Northeastern University. Applications for the scholarships must be secured from and filed with the Secretary, the Traffic Club of New England, 210 Lincoln Street, Boston, Massachusetts.

Alumni Loan Fund

The Alumni Association of the School of Business in Boston has provided a loan fund which is available to students in the Senior and Junior classes in Boston who are in need of financial assistance in order to continue their studies. Applications for loans should be addressed to the Dean of the School. All applications must be approved by the Alumni Loan Fund Committee.

School of Business Loan Fund

By vote of the Student Council a part of the Student Activities fees for 1937–1938 was set aside to provide a loan fund which is available to students temporarily in need of small loans for tuition or other School charges. Students needing assistance from this fund should confer with the Dean who administers it.

E. J. Scannell, Inc. Scholarship

E. J. Scannell, Inc., one of the larger motor carriers operating in the northeastern section of the United States, makes available through tuition scholarships the opportunity for two persons annually to enroll in the course entitled "Motor Carrier Operations." The persons selected for these scholarships shall be employees of motor carriers of freight and shall be between the ages of eighteen and thirty. The administration of the scholarships shall be carried on jointly by William T. Payne, President, E. J. Scannell, Inc., and Prof. Frank M. Cushman, Director, Transportation and Traffic Management Institute of Northeastern University. Persons who are interested must apply by letter addressed to Director, Transportation and Traffic Management Institute, Northeastern University, by August 1 of the school year in which they propose to attend.

Application
Received by _____

Date _____

Northeastern University
SCHOOL OF BUSINESS

360 HUNTINGTON AVENUE, BOSTON 15, MASS.

APPLICATION FOR ADMISSION

A fee of five dollars must accompany this application. Make checks, money orders, or drafts payable to Northeastern University. **This fee is not refundable.** This fee is included under the educational benefits of the G. I. Bill of Rights.

Date _____

Mr.
Mrs.
I (Print name in full) Miss _____ ....

(First)   (Middle)   (Last)

hereby apply for admission to the School of Business, for the program designated.

Associate ☐ In Accounting
           ☐ In Management

Certificate ☐ Credit & Financial Management Institute
            ☐ Institute for Business & Professional Secretaries
            ☐ Institute of Insurance
            ☐ Institute of Municipal Management
            ☐ Institute of Retailing
            ☐ Institute of Traffic Management
            ☐ Labor Relations Institute
            ☐ Office Management Institute
            ☐ Production Management Institute
            ☐ Quality Control Institute
            ☐ Real Estate Institute
            ☐ World Trade Institute

B.B.A.
Degree
☐ Commercial or Industrial Accounting
☐ Public Accounting (C.P.A.)
☐ Cost Accounting
☐ Business Management
☐ Credit and Financial Management
☐ Industrial Management
☐ Insurance
☐ Law and Business
☐ Marketing
☐ Office Management
☐ Personnel and Industrial Relations
☐ Production Management
☐ Real Estate
☐ Transportation and Traffic Management
☐ In Engineering and Management

☐ Single Courses only: (List each course) ....

....

Mail address: Street .... City .... State ....

Home address: Street .... City .... State ....

(OVER)

Date of birth... Age............... yrs......... mos.

Are you to take these courses under the G. I. Bill of Rights?....................
☐ Yes ☐ Single
☐ No ☐ Married

Name and address of parent or guardian if under 21 years of age....................

....

I have attended, including other schools of the Northeastern University system, the following schools above grammar grade. List all junior and senior high schools, evening high schools, preparatory schools, colleges and universities (if attendance at a university, *designate school*).

NAME OF SCHOOL	LOCATION — CITY, STATE	Check Years Attended				Date Left	Date of Graduation	Degree if any
		1	2	3	4			

I request advanced standing credit for previous college work completed at (name of institution)..................

....

For information relative to my character and general ability, I refer you to the following person who is not a student or relative:

Name..

City...........................State.........................Occupation........... ...

I first learned of Northeastern University through..................

Following is the name and address of the person who recommended that I enter the School of Business..................

....

I am employed as indicated below.

....
Name and Address of Employer

....
My Position

....
(My Usual Signature)

NORTHEASTERN UNIVERSITY

COEDUCATIONAL

Programs of instruction leading to appropriate degrees are offered by the Schools and Colleges of the University in the following areas of study:

LIBERAL ARTS

The COLLEGE OF LIBERAL ARTS offers a broad program of courses in the sciences, mathematics, modern languages, humanities, and social studies serving as a foundation for the understanding of modern culture, social relations, and technical achievement. Varied opportunities are available for specialization. Degrees: Bachelor of Arts or Bachelor of Science.

The EVENING DIVISION of the College offers courses in arts and social sciences during evening and Saturday morning hours. Degrees: Bachelor of Arts; Associate in Arts.

EDUCATION

The COLLEGE OF EDUCATION offers day curricula combining broad general education and professional study for the preparation of elementary and secondary school teachers. Degree: Bachelor of Science in Education.

The GRADUATE DIVISION of the College offers, during late afternoon, evening and Saturday morning hours, advanced courses leading to the degree of Master of Education.

BUSINESS

The COLLEGE OF BUSINESS ADMINISTRATION offers curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management. Each curriculum represents in itself a broad survey of business technique, differing from the others chiefly in emphasis. Degree: Bachelor of Science in Business Administration.

The SCHOOL OF BUSINESS, organized specifically to meet through evening classes the needs of employed persons, offers curricula in Accounting, Business Management, Engineering and Management, Industrial Management, Insurance, Marketing, Law and Business, Personnel and Industrial Relations, Real Estate, Retailing, Public Administration, Transportation and Traffic Management. Degrees: Bachelor of Business Administration; Associate in Business Administration.

THE GRADUATE DIVISION of the School provides an evening program of advanced study leading to the degree of Master of Business Administration.

ENGINEERING

The COLLEGE OF ENGINEERING offers professional curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. Degree: Bachelor of Science in Engineering with specification as to field.

The GRADUATE DIVISION of the College offers, during evening hours, advanced courses in certain fields of Civil, Mechanical, and Electrical Engineering, Chemistry, and Mathematics-Physics, leading to the degree of Master of Science.

The LINCOLN INSTITUTE offers four-year evening programs in the technology of various fields of engineering and in chemistry. The curricula comprise courses of college grade which are integrated into programs covering the several specialized fields. Degrees: Associate in Engineering; Associate in Chemistry.

The Cooperative Plan

The Colleges of Liberal Arts, Education, Business Administration, and Engineering offer day programs and are conducted on the Co-operative Plan. After the freshman year students alternate periods of study with periods of work in the employ of business or industrial concerns. Under this plan they gain valuable experience and earn a large part of their college expenses.

For further information regarding any of the above schools, address

Director of Admissions

NORTHEASTERN UNIVERSITY

BOSTON, MASSACHUSETTS

NORTHEASTERN UNIVERSITY

LVX
VERITAS
VIRTVS

BULLETIN
1954-1955

EVENING SESSIONS
College of Liberal Arts
(COEDUCATIONAL)

BOSTON 15, MASSACHUSETTS

Office Hours

Interviews

Prospective students, or those desiring advice or guidance regarding any part of the school work or curricula, are encouraged to arrange for personal interviews with the Dean or other officers of instruction. Career planning through competent guidance provides an understanding of professional requirements and develops that definiteness of purpose so vital to success.

Gifts and Bequests

Northeastern University will welcome gifts and bequests for the following purposes:

    (*a*) For its building program.

    (*b*) For general endowment.

    (*c*) For specific purposes which may especially appeal to the donor.

It is suggested that, when possible, those contemplating gifts or bequests confer with the President of the University regarding the University's needs before legal papers are drawn.

The legal name of the University is "Northeastern University." However, in the making of gifts and bequests to Northeastern, the following wording is suggested: "Northeastern University, an educational institution incorporated under the laws of Massachusetts and located in Boston, Massachusetts."

ADDRESS

Director of Evening Courses

NORTHEASTERN UNIVERSITY

COLLEGE OF LIBERAL ARTS

360 Huntington Avenue, Boston 15, Mass.

Telephone: COpley 7-6600

NORTHEASTERN UNIVERSITY

College of Liberal Arts

BULLETIN
OF EVENING COURSES
(COEDUCATIONAL)

The University is located at the entrance to the
Huntington Avenue subway within nine minutes of
Park Street and easily accessible from all points.

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NORTHEASTERN UNIVERSITY

COLLEGE OF LIBERAL ARTS

Evening Courses

Calendar

1954

Summer session classes begin............. { School of Business, June   1
Liberal Arts.......June   21

Summer session classes end................................Aug.   26

Fall semester classes begin............... { Liberal Arts.......Sept.   10
School of Business, Sept.   20

Legal Holiday — No class sessions...........................Oct.   12

Week for first term tests................. { Liberal Arts.......Oct.   18–22
School of Business, Oct.   25–30

Legal Holiday — No class sessions...........................Nov.   11

Legal Holiday — No class sessions...........................Nov.   25

Week for second term tests.............. { School of Business, Dec.   6–11
Liberal Arts.......Dec.   13–17

Final class session before Christmas recess.....................Dec.   21

1955

First class session after Christmas recess.......................Jan.   3

Final examinations, fall semester............................Jan.   24–29

Spring semester classes begin...............................Jan.   31

Legal Holiday — No class sessions...........................Feb.   22

Week of first term tests.................. { School of Business, March   7–12
Liberal Arts.......March 14–19

Legal Holiday — No class sessions...........................April   19

Week of second term tests............... { School of Business, April   18–23
Liberal Arts.......April   25–30

Final examinations — spring semester...... { School of Business, May   23–28
Liberal Arts.......June   6–10

Summer session classes begin............. { School of Business, May   31
Liberal Arts.......June   13

Summer session classes end................................Aug.   25

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General Statement

NORTHEASTERN UNIVERSITY is incorporated as a philanthropic institution under the General Laws of Massachusetts. The State Legislature, by special enactment, has given the University general degree granting powers.

The Corporation of Northeastern University consists of men who occupy responsible positions in business and the professions. This Corporation elects from its membership a Board of Trustees in whom the control of the institution is vested. The Board of Trustees has four standing committees: (a) an Executive Committee which has general supervision of the financial and educational policies of the University; (b) a Committee on Buildings which has general supervision over the building needs of the University; (c) a Committee on Funds and Investments which has the responsibility of administering the funds of the University; (d) a Committee on Development which is concerned with furthering the development plans of the University.

Founded in 1898, Northeastern University, from its beginning, has had as its dominant purpose the discovery of human and social needs and the meeting of these needs in distinctive and highly serviceable ways. While subscribing to the most progressive educational thought and practice, the University has not duplicated the programs of other institutions but has sought "to bring education more directly into the service of human needs."

The following is a brief outline of the principal types of educational opportunities offered by the University.

In the Field of Liberal Arts

The College of Liberal Arts offers majors in the usual fields of the arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. With the exception of pre-professional programs, day curricula are normally five years in length and operated on the Co-operative Plan. However, in all majors except Chemistry and Physics, qualified students, with the approval of the Dean, may elect to complete the requirements for the degree on a full-time plan in four years.

The College of Liberal Arts also offers certain of its courses during evening hours, constituting programs of study leading to the degrees of Bachelor of Arts or Associate in Arts.

In the Field of Education

The College of Education offers four-year curricula leading to the degree of Bachelor of Science in Education. These are designed particularly to meet the needs of high school graduates who desire to prepare themselves for teaching and administrative positions in elementary and secondary schools.

During late afternoons, evenings and Saturday mornings, the College of Education also sponsors graduate courses for teachers in service and leading to the degree of Master of Education.

In the Field of Business

The College of Business Administration offers five-year co-operative curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management leading to the degree of Bachelor of Science in Business Administration. Four-year conventional programs not involving co-operative work, leading to the same degree, are also available for veterans.

The School of Business — operated during evening hours — offers undergraduate curricula leading to the degree of Bachelor of Business Administration in Accounting, Management, Law and Business, and Engineering and Management. For students who because of occupational reasons desire shorter programs concentrating in specific areas, Institutes awarding the certificate are offered in Credit and Financial Management, Insurance, Labor Relations, Municipal Management, Office Management, Production Management, Quality Control, Real Estate, Retailing, Traffic and Transportation, World Trade, and for Business and Professional Secretaries.

The Graduate Division of the School of Business provides an evening program of graduate study leading to the degree of Master of Business Administration.

In the Field of Engineering

The College of Engineering offers five-year co-operative curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering leading to the degree of Bachelor of Science with specification according to the department in which the student qualifies.

The College of Engineering also offers during evening hours graduate programs of instruction leading to the degree of Master of Science in certain fields in Civil, Mechanical and Electrical Engineering, in Mathematics-Physics, and in Chemistry. These curricula are designed to provide engineering graduates opportunities for further professional development.

The Lincoln Institute offers during evening hours programs leading to the degrees of Associate in Chemistry and Associate in Engineering in Civil, Mechanical, Electrical, Electronic, and Industrial Engineering.

Buildings and Facilities

University Buildings

Huntington Avenue Campus

The principal educational buildings of Northeastern University are located on a sixteen-acre site in the Back Bay section of Boston. They have been erected in accordance with a long-range development plan for meeting the University's needs; the largest units are interconnected by means of tunnels so that students can go from building to building without going out of doors in inclement weather. Brief functional descriptions of the various University buildings follow.

Richards Hall — Headquarters of the main administrative officers and staff of both day and evening divisions and the central office. The ground floor contains the University Bookstore, a check room, receiving room, laboratories and classrooms.

On the first floor are located offices of the president, vice-president, deans, director of admission, director of development, and the bursar. The three upper floors of Richards Hall are given over to additional administrative and instructional offices, classrooms, lecture halls, and the principal laboratories of the departments of physics, chemistry, and psychology. The penthouse contains a radio room and laboratories for chemical research.

Student Center Building — The Student Center comprises a building of five stories located in the middle of the campus together with the Alumni Auditorium which seats about 1300 people.

Outstanding features of the Student Center Building are the beautiful memorial chapel, which accommodates 250 persons, given in memory of Charles F. Bacon, the large public lounge given in memory of Edward J. Frost, the Student Health Center given in memory of Samuel Glass, the Student Activities Office given in memory of Albert Farwell Bemis, the Student Union Lounge given in memory of Richard Mitton, the Student Conference Room given in memory of Russell Whitney, the Student Reading Room given in memory of Gordon F. Wright, the Faculty Lounge given in memory of Robert Lee Studley, and the main lobby given by Clara and Joseph F. Ford.

The Student Center also contains headquarters for the various student organizations such as the *Northeastern News*, *The Cauldron*, Dramatic Society, the Camera Club, and the Northeastern Student Union.

Facilities for lunching purposes are provided in the University Commons on the ground floor. Also located on the ground floor is a large recreational area especially for women students. Although the building is primarily used for student activities, there are a few classrooms on the third and fourth floors.

Science Hall — Science Hall comprises a ground floor and four upper stories housing laboratories, classrooms, lecture halls, and offices. The fourth floor is given over almost entirely to the biological laboratories and offices, research areas, and the biology lecture room.

Library Building — This structure, completed in 1952, a companion building to Richards Hall, consists of five floors, and contains about 85,000 square feet of floor area. It provides reading room seating capacity for over 600 students and stack capacity for 160,000 volumes in addition to the special facilities of a modern university library. A well-equipped listening room, a browsing library, smoking rooms, and a microfilm room are included among these facilities.

Until such time as the upper two and one-half floors are needed for library purposes, they will house the faculty offices of the Department of Drawing and the Department of English, and will provide classrooms and drawing rooms.

Greenleaf Building — The Greenleaf Building was acquired by the University in 1949. This building houses the Maintenance Department and the Department of Military Science and Tactics. The Greenleaf Building also makes available additional classrooms, faculty offices, and research areas. It is a $2\frac{1}{2}$ story brick building on the westerly end of the University's Huntington Avenue campus.

Gymnasium and Indoor Athletic Field — The new physical education center which is now under construction will be available for use in September, 1954. The main units are the gymnasium building and the indoor athletic field. The gymnasium

building will provide separate gymnasiums for men and women students, locker rooms for men and women students, and such special areas as a boxing room, wrestling room, rifle range, special exercise rooms, equipment room, laundry, and locker rooms for faculty and visitors.

The indoor athletic field building will provide a cinder running track which will be approximately ten laps to the mile and an indoor athletic field with loam surface. A special feature of this building will be a separate cinder straightaway for sprints and hurdles adjoining the running track.

A connecting building joining these structures will include space for offices, entrance lobby, main lobby, storage, check rooms, and other public facilities.

The facilities of the new physical education center will make possible fine programs in physical education as well as indoor intramural and intercollegiate athletics.

Parking Facilities — Extensive parking areas for students and staff are included on the Huntington Avenue campus, with an auxiliary parking space behind the Boston Opera House in the triangle formed by St. Stephen, Forsyth, and Hemenway Streets.

Laboratories

The laboratories of the University, which are of special interest to students in the field of Education, fall into two categories. The first group includes those for experimental work in the sciences of biology, chemistry, physics, and psychology. The second comprises the business and statistical laboratories.

In addition to these laboratory facilities which are described in the following pages, motion pictures and lantern slides are frequently used to supplement classroom instruction. For this purpose, there are available motion picture projectors for both sound and silent film as well as lantern slide projectors.

Biology

The Department of Biology occupies the fourth floor of Science Hall which contains, in addition to the Zoological, Anatomical, Bacteriological, and Botanical Laboratories, its offices, research areas, and lecture hall. The laboratories are fully equipped for general and special work, with extensive collections of museum preparations, models, and collections displaying thousands of specimens illustrating the various fields of biological study.

Chemistry

The Chemical Laboratories located on the fourth floor of Richards Hall were given to the University by the Charles Hayden Foundation. They are equipped for work in general and inorganic chemistry, qualitative and quantitative analysis, and organic and physical chemistry.

There are also service rooms, research laboratories and a shop.

General Chemistry and Qualitative Analysis — This laboratory is equipped with gas, water, electricity, balances and fume hoods. Hydrogen sulfide is connected in the hoods from a separate room which contains cylinders and a gasometer. Each student is assigned a drawer containing all his needed equipment.

Quantitative Analysis and Physical Chemistry — The tables and fume hoods and other equipment in this room are similar to those in the Organic Laboratory with the addition of variable voltage direct current.

In addition there are a drying oven, electric hot plate, and refrigerator.

The balances are in an adjoining well-lighted room.

Instrumental Analysis Laboratory — Adjoining the quantitative analysis laboratory are two smaller laboratories equipped with modern instruments for analysis of solids, liquids, and solutions. Apparatus is also available for technical analysis of commercial materials.

Physics

The Physics Laboratories located on the second floor of Richards Hall are fully equipped for elementary and advanced study as well as research.

General — This laboratory, designed for elementary instruction, is provided with gas, water, and electricity. A spectrometer room, a photographic room, and a photometer room are directly connected with this laboratory.

A second smaller laboratory is equipped for more specialized experiments, and has facilities for glass blowing and high vacuum work. A flexible electrical system here permits use of all the supplies available to the Advanced Laboratory.

Advanced — This laboratory is designed with a view to both precision and flexibility. A special switchboard provides single phase and polyphase alternating current and a variety of direct current potentials. A workshop with lathe, drill press, grinder, and other tools as well as two separate research rooms complement the laboratory.

Psychology

The Psychology Laboratories, located on the third floor of Richards Hall, are equipped for training and research in both experimental psychology and psychometrics.

The Experimental Laboratory is designed for instruction in learning processes, the factors involved in perception and the bases of sensation. Opportunity is provided for individual research for advanced students.

The Psychometrics Laboratory is equipped for training in the use of mental tests. Instruction is available in the nature of tests of intelligence, aptitudes, and personality. There is opportunity for practice and research in the use of psychometric instruments.

Statistics Laboratory

The Statistics Laboratory is equipped with the commonly used office machines, hand and electric adding machines, and hand and electric calculators. This laboratory is used primarily in connection with the courses in Statistics, but it is available for students in connection with reports and the statistical work of other courses.

Accounting and Advertising Laboratory

The Accounting and Advertising Laboratory is being developed to provide permanent display equipment and materials, teaching aids, and production equipment for the advanced courses in the fields of Accounting and Advertising.

Typewriting Laboratory

This room is equipped with a battery of 24 typewriters, which are used by students taking courses in typewriting, those who wish to develop facility in typewriting skill and those who desire to typewrite class notes or other written assignments.

Equipment for Physical Training

Gymnasium areas are provided as follows: three gymnasium rooms, a twelve-lap running track, boxing and wrestling rooms, handball and squash courts, bowling alleys, showers, steam baths, massage rooms, electric cabinet baths, and locker rooms.

Special areas for the physical education program for women students are located in the Student Center Building.

Excellent practice facilities for tennis and track are available in the space adjacent to the North Parking Area.

Northeastern University Athletic Field

The University athletic field is located on Kent Street in Brookline and provides ample facilities for track, baseball, football and other outdoor sports. The University maintains bus service between its Huntington Avenue plant and the field, making it possible for students to get back and forth with a minimum loss of time. The field is equipped with a commodious field house as well as ten sections of stadium seats for spectators.

The College of Liberal Arts

Aims

IN PROVIDING the means to a modern liberal education, the College of Liberal Arts of Northeastern University has a threefold objective: first, the development of intellectual capability; second, the development of a well-rounded personality; and third, preparation for a vocation.

Intellectual capability rests upon the foundation of a sound general education. Through the required and elective courses of all curricula, students are guided toward a mastery of the leading ideas, significant facts, and the habits of thought and methods of work in the areas of language, natural science, social science, and the humanities. With this training the student will better understand the world and society in which he lives, appreciate more fully the basic values upon which civilization and culture rest, and perceive and accept his responsibilities as an active participant in social groups — the family, the community, the nation and the world. At the same time the student is aided in the development of a resourceful and independent mind, the ability to use as well as to accumulate knowledge, and the awareness of his mental strengths and weaknesses.

Since liberal arts colleges were originally established for the purpose of training for certain professions, the College of Liberal Arts holds that there is no inconsistency between a truly liberal education and preparation for a vocation. Today it is widely accepted that a liberal education must prepare both for the art of living and the obtaining of a living.

Methods

To enable each student to plan a college program in keeping with his own interests and aptitudes, a wide range of electives is offered. This does not mean that students are free to elect courses indiscriminately, for if they are to obtain a liberal education they must have training in several basic fields. Therefore, the Faculty Committee on Education has established basic minimum requirements in each of several fields. These distribution requirements are outlined with each of the program offerings.

Programs of Instruction

To achieve the aims established for the Evening Programs in Liberal Arts, of serving men and women who are engaged in full-time employment during the day, the College offers curricula leading to the baccalaureate and associate degrees, and Institute programs in which certificates are awarded. The various individual courses of study are outlined on the following pages of this catalog. Course descriptions are included by departments beginning on page 36.

The Bachelor of Arts Degree

Major fields of study are offered in Economics, History-Government, and Sociology. Each student will choose a minor field in consultation with his faculty adviser.

The distribution requirements, including certain required courses, are shown with each curriculum. Upon petition to the faculty, students may be permitted in exceptional cases to substitute other courses which will more adequately serve their specific vocational objectives.

Quantity Requirements

Candidates for a degree must have completed one of the curricula listed on pages 16-17. Each curriculum normally provides for not less than 130 semester hours of work, including at least 30 semester hours of advanced work in a major field, and at least 15 semester hours of prescribed or elective courses in a related minor field.

All candidates for a degree must have satisfactorily completed in college one year of a modern foreign language above the elementary level.

No student transferring from another college or university is eligible to receive a degree until at least one year of academic work (24 semester hours credit) has been completed at Northeastern immediately preceding graduation.

The suggested curricula indicate that the degree requirements may be completed in six academic years.

Many students will find it advisable to spread their academic loads either by taking courses during the summer or by extending their programs over a longer period.

Quality Requirements

Of the 130 or more semester hours required for a degree, at least 85 semester hours must have been completed with a grade of C or better.

Graduation with Honor

Candidates who have achieved distinctly superior attainment in their academic work will be graduated with honor. Upon special vote of the faculty, a limited number of this group may be graduated with high honor or with highest honor. Students must have been in attendance at the University at least three years before they may become eligible for honors at graduation.

Curriculum in Economics

Course No.	FIRST YEAR	Sem. Hrs.
Ec1	ECONOMIC PRINCIPLES	4
Ec2	ECONOMIC PROBLEMS	4
E1-2	ENGLISH 1	4
G1-2	AMERICAN GOVERNMENT	4
Sc1-4	SUR. PHYSICAL SCIENCES or	
Sc5-8	GENERAL BIOLOGY	8

Course No.	SECOND YEAR	Sem. Hrs.
H1-4	HISTORY OF CIVILIZATION	8
†Ec7-8	STATISTICS I and II	5
Sc5-8	Elective	8

Course No.	THIRD YEAR	Sem. Hrs.
S1-2	SOCIOLOGY, PRINCIPLES	4
S3-4	Sociology, Problems	4
Ps1-2	PSYCHOLOGY, GENERAL	4
Ps3	Psychology of Personality	2
Ps4	Abnormal Psychology	2
†Ec5-6	FINANCING BUS. OPERATIONS	5

Course No.	FOURTH YEAR	Sem. Hrs.
†Ec21	ECONOMIC GEOGRAPHY	2½
†Ec22	INTERNATIONAL ECONOMICS	2½
†Ec11-12	FIN. POL. & PLG	5
E31-32	WORLD LITERATURE	4
Ph1-2	PHILOSOPHY	4

Course No.	FIFTH YEAR	Sem. Hrs.
†Ec18	MONEY AND BANKING	2½
†Ec19	BUSINESS FLUCTUATIONS AND FORECASTING	2½
	MODERN LANGUAGE	4
F1-2	HISTORY OF ART	4
†A13-14	ACCOUNTING	5

Course No.	SIXTH YEAR	Sem. Hrs.
†G200	COMPARATIVE ECON. SYSTEMS	2½
†G201	HISTORY ECON. THOUGHT	2½
	MODERN LANGUAGE	4
H9-10	U. S. History	4
†IR22	Labor Economics	2½
†L16	Govt. Controls in Business	2½

*Additional courses to complete semester hour requirements:

Ec9-10   Bus. Planning and Research...5   Ec15-16 Applied Security Analysis.....5

Curriculum in History-Government

Course No.	FIRST YEAR	Sem. Hrs.
H1-4	HISTORY OF CIVILIZATION	8
G1-2	AMERICAN GOVERNMENT	4
E1-2	ENGLISH 1	4
Sc1-4	SUR. PHYSICAL SCIENCES or...	
Sc5-8	BIOLOGY	8

Course No.	SECOND YEAR	Sem. Hrs.
H9-10	U. S. HISTORY	4
G3-4	COMPARATIVE GOVERNMENT	4
Ec1-2	ECONOMIC PRINCIPLES	4
Ec3-4	ECONOMIC PROBLEMS	4
E31-32	WESTERN WORLD LITERATURE	4
S1-2	SOCIOLOGY PRINCIPLES	4

Course No.	THIRD YEAR	Sem. Hrs.
H19-20	ENGLISH HISTORY	4
H11	RECENT AMERICAN HISTORY	2
G14	AMERICAN POLITICAL PARTIES	2
G15-16	AMERICAN FOREIGN POLICY	4
S9	CULTURAL ANTHROPOLOGY	2
S25-26	ETHNOLOGY	4
E15-16	ENGLISH LITERATURE	4

Course No.	FOURTH YEAR	Sem. Hrs.
H21	MODERN EUROPEAN HISTORY	2
H22	RECENT EUROPEAN HISTORY	2
H13	ENGLISH CONST. HISTORY	2
H14	AMERICAN CONST. HISTORY	2
G8	MODERN POLITICAL THEORY	2
Ph1	INTRO. TO PHILOSOPHY	2
Ps1-2	PSYCHOLOGY, GENERAL	4
	Elective from Ec. Soc. or Psych.	4

Course No.	FIFTH YEAR	Sem. Hrs.
H27-28	INDIA AND FAR EAST	4
H23-24	SOVIET UNION	4
	MODERN LANGUAGE	4
Ph7-8	SOCIAL ETHICS	4
	Elective from Ec. Soc. or Psych.	4

Course No.	SIXTH YEAR	Sem. Hrs.
H29-30	LATIN AMERICAN HISTORY	4
L16	GOV. CONTROLS IN BUS.	2½
PA40	STATE & LOCAL RELATIONS	2½
	MODERN LANGUAGE	4
E25	AMERICAN LIT. TO 1860	2
E26	AMERICAN LIT. SINCE 1860	2
F1-2	HISTORY OF ART	4

Curriculum in Sociology

Course No.	FIRST YEAR	Sem. Hrs.
H1-4	HISTORY OF CIVILIZATION	8
Sc5-8	BIOLOGY	8
E1-2	ENGLISH I	4
G1-2	AMERICAN GOVERNMENT	4

Course No.	SECOND YEAR	Sem. Hrs.
Ec1	ECONOMICS, PRINCIPLES	4
Ec2	Economics, Problems	4
†Ec7-8	STATISTICS I AND II	5
S1-2	SOCIOLOGY, PRINCIPLES	4
S3	SOCIAL PROBLEMS	2
S4	SOCIAL PATHOLOGY	2

THIRD YEAR

Ps1-2	PSYCHOLOGY, GENERAL	4
Ps3	PSYCHOLOGY OF PERSONALITY	2
Ps4	ABNORMAL PSYCHOLOGY	2
S27-28	AMERICAN CULTURE	4
S9	CULTURAL ANTHROPOLOGY	2
S25	ETHNOLOGY	2
S5	Group Dynamics	$2\frac{1}{2}$
†IR7	Industrial Sociology	$2\frac{1}{2}$

FOURTH YEAR

S13-14	JUVENILE DELINQUENCY	4
S15-16	CRIMINOLOGY	4
†IR11-12	Human Relations	5
†IR5	Psych. Bus. and Ind.	$2\frac{1}{2}$
†IR15	Employment Testing	$2\frac{1}{2}$
Ph1-2	PHILOSOPHY	4

FIFTH YEAR

S19	THE FAMILY	2
S32	URBAN SOCIETY	2
	MODERN LANGUAGE	4
†IR22	Labor Economics	$2\frac{1}{2}$
†L16	Government Controls in Bus.	$2\frac{1}{2}$
†IR6	Training Methods	$2\frac{1}{2}$
†E11	Public Speaking — Parliamentary Procedure	$2\frac{1}{2}$

SIXTH YEAR

S21-24	SOCIAL SERVICE I AND II	8
S30-31	SOCIAL THEORY	4
	MODERN LANGUAGE	4
Ph7-8	Social Ethics	4

*Additional courses to complete semester hour requirements:

H9-10	U. S. History	4	E31-32 World Literature	4

*These credits may be earned in the course suggested or others of equal semester hours credit either (1) during the summer, or (2) by extending the program over an additional year.

†Courses offered through the School of Business.

The courses in caps and small caps are required of all degree candidates. Those in regular type are suggested electives, substitutions for which may be arranged.

The Associate in Arts Degree

The program leading to the Associate Degree is offered for those who are desirous of obtaining a general cultural background in the liberal arts and humanities, but who do not wish to pursue a major field of concentration for the baccalaureate degree.

Quantity Requirements

Candidates for the Associate in Arts degree must complete a minimum of 72 semester hours of credit. This is approximately one-half of the requirements (130 semester hours) for the Bachelor of Arts degree.

To provide a balanced program which will achieve the established objectives, the faculty has set minimum credit requirements in the several fields of study as follows:

Distribution Requirements

	Sem. Hrs.
Economics	4
English	12
Fine Arts	4
Government	6
History	8
Philosophy	2
Psychology *or* Sociology	4
Science	8
Other courses	24
TOTAL	72

These requirements can be completed by class attendance three evenings a week for three academic years of forty (40) weeks each. In many cases it will be advisable in the interest of the students to satisfy the requirements by attendance over a longer period. On the other hand, attendance during the Summer Term will make it possible to shorten the length of time, or at least distribute the course load more evenly over the entire calendar year. For complete information regarding the academic calendar, see page 3.

Quality Requirements

To qualify for the Associate in Arts degree, the student must achieve a minimum cumulative average of seventy (70) per cent.

Curriculum in Social Sciences

For those wishing an integrated program of courses in the social sciences. The functional approach used in the design of these courses makes them especially valuable for those desiring practical instruction to equip themselves for employment as social service workers. They are also of practical value to teachers of social science courses in high schools as well as the large number of men and women who will find them worth while in providing information which should lead to happier lives through a better understanding of human associations.

The Associate Degree will be awarded upon satisfactory completion of seventy-two (72) semester hours of credit comprising the following suggested curriculum:

Program of Courses

FIRST YEAR

Course No.		Sem. Hrs.	Course No.		Sem. Hrs.
S1-2	Sociology	4	S3	Social Problems	2
Sc5-6	Biology	4	S4	Social Pathology	2
S9	Cultural Anthropology	2	Sc7-8	Biology	4
Ph1	Philosophy	2	Ph7	Social Ethics	2
			IR7	Industrial Sociology	2½

SECOND YEAR

Ps1-2	General Psychology	4	Ps3	Psychology of Personality	2
H1-2	History of Civilization	4	Ps4	Abnormal Psychology	2
S13	Juvenile Delinquency	2	H3-4	History of Civilization	4
S15	Criminology	2	S14	Juvenile Delinquency	2
			S16	Criminology	2

THIRD YEAR

S21-22	Social Service I	4	S23-24	Social Service II	4
S19	The Family	2	S32	Urban Society	2
S25	Ethnology	2	S27-28	American Culture	4
S30-31	Social Theory	4			

The above requirements may be met by class attendance three evenings a week, forty weeks each year, for three years. In some cases it may be advisable for the best interests of the student that he take more than three years to complete this program.

Quality Requirements

To qualify for the Associate in Social Sciences degree, the student must achieve a minimum cumulative average of seventy (70) per cent.

Graduation with Honor

Candidates who have maintained an honor grade average will be graduated with honor. To be eligible for honors, a student must have completed a minimum of two full years of study in the College of Liberal Arts.

Liberal Arts and Business

A Combined Program Leading to the Degree of Bachelor of Business Administration

The University recognizes the dual purpose of education: (1) to prepare the student to live a full and effective life, (2) to train him for earning his living. There are several areas of employment which require as preparatory training a natural combination of liberal arts with business courses.

To meet this need, the College of Liberal Arts, through its evening program, offers in conjunction with the School of Business a six-year curriculum leading to the degree of Bachelor of Business Administration with specification.

Programs of Instruction

On the following pages, three suggested curricula are shown which demonstrate the possibility of combining courses of an applied nature with those in Liberal Arts to serve specific needs. Similar programs can be arranged in consultation with the Dean to serve the needs of students desirous of training for other areas of work.

Quantity Requirements

Liberal Arts: *Sem. Hrs.*

Course credits totaling seventy-two (72) semester hours in an approved program ..   72

Business:

Course credits totaling forty-five (45) semester hours in an approved program ...   45

Occupational Experience:

A maximum of thirteen (13) semester hours is awarded based upon the nature and quality of the student's employment during his enrollment.....................   13

Total semester hours required for the degree............................   130

Quality Requirements

The degree of Bachelor of Business Administration is awarded through the School of Business. The student must achieve a minimum cumulative average of seventy (70) per cent for all work completed at Northeastern to qualify for the degree.

Graduation with Honors

Three honorory distinctions are conferred upon properly qualified candidates for the bachelor's degree upon graduation: highest honors, high honors, and honors.

To be entitled to honors, a student must have completed a minimum of two full years of study in the school. Courses credited by advanced standing, whether by transfer or by examination, will be eliminated in determining honors.

Residence Requirement

Every degree candidate must satisfactorily complete at Northeastern University, immediately preceding graduation, a minimum of thirty (30) semester hours of credit, at least ten (10) of which must be in the candidate's major field.

Personnel and Industrial Relations Curriculum

Combined Program in Liberal Arts and Business
Leading to the Degree of Bachelor of Business Administration

Course No.	FIRST YEAR	Sem. Hrs.	Course No.	SECOND YEAR	Sem. Hrs.
H1-4	HISTORY OF CIVILIZATION	8	Ec1-2	ECONOMICS, PRINCIPLES	4
Sc5-8	BIOLOGY	8	Ec3-4	Economics, Problems	4
E1-2	ENGLISH 1	4	†Ec7-8	STATISTICS I AND II	5
G1-2	AMERICAN GOVERNMENT	4	S1-2	SOCIOLOGY	4
			S3	Social Problems	2
			S4	Social Pathology	2

Course No.	THIRD YEAR	Sem. Hrs.	Course No.	FOURTH YEAR	Sem. Hrs.
Ps1-2	PSYCHOLOGY, GENERAL	4	Ph1	PHILOSOPHY	2
Ps3	PSYCH. OF PERSONALITY	2	Ph9	LOGIC	2
Ps4	ABNORMAL PSYCHOLOGY	2	E31-32	WORLD LITERATURE or	
S9	Cultural Anthropology	2	E15-16	ENGLISH LITERATURE	4
S25	Ethnology	2	†IR11-12	HUMAN RELATIONS	5
S27-28	American Culture	4	†IR5	PSYCH. FOR BUS. AND IND.	2½
IR3	PSYCH. GROUP DYNAMICS	2½	†IR13	PERS. MGMT. PRACTICES	2½
†IR7	INDUSTRIAL SOCIOLOGY	2½			

Course No.	FIFTH YEAR	Sem. Hrs.	Course No.	SIXTH YEAR	Sem. Hrs.
†IR22	LABOR-MGMT. RELATIONS	2½	†IR25	LABOR AGREEMENTS	2½
†IR6	Training Methods	2½	†IR9	WAGE ADMINISTRATION	2½
†IR23	LABOR LEG.—UNION-		†IR27	LAB. REL. SEMINAR	2½
	MANAGEMENT RELATIONS	2½	IR8	Tech. Supervision	2½
†IR24	LABOR LEG.—STD. & COND.		A13-14	Managerial Accounting	5
	OF EMPLOYMENT	2½			
S13-14	Juvenile Delinquency	4			
S15-16	Criminology	4			

The above is a suggested program of courses integrated so as to provide understanding of principles underlying sound human relations policies. The courses in caps and small caps are required. Those in regular type will in most cases serve as most effective supporting courses. However, to meet more adequately the specific training needs of the individual student, a limited substitution for the supporting courses may be selected from those courses listed below:

E6	Business Conferences	D1-2	Marketing
A15-16	Cost Accounting, Managerial	OM2	Office Org. and Administration
S19	Family, The	D3	Principles of Selling
Ec5-6	Financing Business Operations	IM11	Principles Production Planning
L16	Govt. Controls in Business	E11	Public Speaking—Parl. Procedure
F1-2	History of Art	Sc1-2	Sur. Physical Sciences
E10	Industrial Journalism	IM5	Time Study
IM9	Job Evaluation	H9-10	U. S. History
L13	Law	S32	Urban Society

Prelegal Curriculum

Combined Program in Liberal Arts and Business
Leading to the Degree of Bachelor of Business Administration

Course No.	FIRST YEAR	Sem. Hrs.	Course No.	SECOND YEAR	Sem. Hrs.
H1-4	HISTORY OF CIVILIZATION	8	S1-2	SOCIOLOGY, PRINCIPLES	4
Sc1-4	SUR. PHYSICAL SCIENCES *or*		S3	Social Problems	2
Sc5-8	GENERAL BIOLOGY	8	S4	Social Pathology	2
G1-2	AMERICAN GOVERNMENT	4	Ec1-2	ECONOMICS, PRINCIPLES	4
E1-2	ENGLISH I	4	Ec3-4	Economics, Problems	4
			†A13-14	Accounting	5

Course No.	THIRD YEAR	Sem. Hrs.	Course No.	FOURTH YEAR	Sem. Hrs.
Ps1-2	GENERAL PSYCHOLOGY	4	S13-14	Juvenile Delinquency	4
Ps9	Psychology of Personality	2	S15-16	CRIMINOLOGY	4
Ps10	Abnormal Psychology	2	†Ec11-12	FIN. POL. & PLG	5
†Ec5-6	FINANCING BUS. OPERATIONS	5	†L16	GOVT. CONTROLS IN BUS.	2½
H13	ENGLISH CONST. HISTORY	2	E11	Public Speaking — Parl. Proc.	2½
H14	AMERICAN CONST. HISTORY	2			
G15-16	AMER. FOR. POLICY	4			

Course No.	FIFTH YEAR	Sem. Hrs.	Course No.	SIXTH YEAR	Sem. Hrs.
†Ec7-8	Statistics I AND II	5	†A41-42	Basic Federal Taxes	5
†IR22	Labor-Mgmt. Relations	2½	†Re1	Real Estate Fundamentals	2½
†IR24	Labor Legislation	2½	†Re2	Real Estate Law & Convey.	2½
E31-32	WORLD LITERATURE	4		Elective	5
Ph1	PHILOSOPHY	2			
Ph9	LOGIC	2			

The courses comprising the suggested program shown above were selected because of their value in providing a background knowledge for several of the fields with which the lawyer becomes involved in his professional practice. The courses in caps and small caps are required. Those in regular type will in most cases serve as effective supporting courses. However, to meet more adequately the specific needs of the individual students, a limited number of substitutions for the supporting courses may be selected from those courses listed below:

G14	American Political Parties	IR7	Industrial Sociology
E6	Business Conferences	D23	Legal Aspects For. Trade
In27	Business Insurance	D36	Management Small Business
In11-12	Casualty Insurance	G8	Modern Political Theory
In5	Claims Procedure	PA38	Municipal Law
G3-4	Comparative Government	OM2	Office Org. and Administration
D33	Credit Fundamentals	A45-46	Tax Planning
In23	Group Insurance	A49	Tax Procedure
		H9-10	U. S. History

Public Administration Curriculum

Combined Program in Liberal Arts and Business
Leading to the Degree of Bachelor of Business Administration

Course No.	FIRST YEAR	Sem. Hrs.
H1-4	HISTORY OF CIVILIZATION	8
G1-2	AMERICAN GOVERNMENT	4
E1-2	ENGLISH I	4
Sc1-4	SUR. PHYSICAL SCIENCES *or*	
Sc5-8	BIOLOGY	8

Course No.	SECOND YEAR	Sem. Hrs.
Ec1-2	ECONOMICS, PRINCIPLES	4
Ec3-4	Economics, Problems	4
H13	ENGLISH CONST. HISTORY	2
H14	AMERICAN CONST. HISTORY	2
G3-4	COMPARATIVE GOVERNMENT	4
E31-32	WORLD LITERATURE	4
G15-16	HISTORY AMER. FOR. POLICY	4

Course No.	THIRD YEAR	Sem. Hrs.
S1-2	SOCIOLOGY PRINCIPLES	4
S3	Social Problems	2
S4	Social Pathology	2
Ps1-2	PSYCHOLOGY, GENERAL	4
G3-4	COMPARATIVE GOVERNMENT	4
†A13-14	Managerial Accounting	5

Course No.	FOURTH YEAR	Sem. Hrs.
G14	American Political Parties	2
S32	Urban Society	2
†L13-14	LAW I AND II	5
†Ec5-6	FINANCING BUS. OPERATIONS	5
H9-10	U. S. HISTORY	4

Course No.	FIFTH YEAR	Sem. Hrs.
†L15	LAW III	2½
†L16	GOVT. CONTROLS IN BUS.	2½
†RE1	Real Estate Fundamentals	2½
†RE2	Real Estate Law & Convey.	2½
†Ec11-12	FIN. POL. & PLG.	5

Course No.	SIXTH YEAR	Sem. Hrs.
†PA40	STATE and LOCAL RELATIONS	2½
†PA39	Tech. Municipal Mgmt.	2½
†PA41	Prin. of Assessing	2½
†PA43-44	Council-Mgr.-Pub. Relations	5
†PA38	Municipal Law	2½

†Courses offered through the School of Business.

The above is a suggested program of courses designed to cover the various fields of public administration: Municipal, State, and Federal. The courses in caps and small caps are required as basic to all fields. Those in regular type will, in most cases, serve as effective supporting courses. However, a liberal policy of substitutions for the supporting courses is applied to this curriculum to enable the student to obtain the courses most closely related to that field of public administration in which he wishes to concentrate. These substitutions, in general, may be chosen from those listed below:

E15-16	English Literature	OM2	Office Org. and Administration
H27-28	Far East	PA31	Principles Public Works
H29-30	Latin-American History	PA33-34	Adv. Public Works
G8	Modern Political Theory	RE11	R. E. Appraisal — Residential
PA35	Municipal Accounting I	RE13	R. E. Appraisal — Com.
PA36	Municipal Accounting II	A21-22	Social Service I and II
PA37	Municipal Finance	H23-24	Soviet Union

The Family Institute

The family has always been recognized as one of the fundamental units of any social structure. With the increasing complexity of our economic and social order, the problems associated with family relationships have become of major importance. Sociologists are aware of the change taking place in family life. Industry is increasingly conscious of the effect that family relationships have upon the productive efficiency of its employees.

The Family Institute presents courses for those who personally may wish a better understanding of successful family relationships as well as for those who may wish to use the training professionally in some phase of social work or in industry where it is being discovered that human relations are of primary concern to good management.

Program of Courses

	Sem. Hrs.		*Sem. Hrs.*
Principles of Sociology	4	Juvenile Delinquency	4
Social Problems	2	The Family	4
Social Pathology	2	Biology	4
General Psychology	4	Fundamentals of Social Sciences	4
Psychology of Personality	2	Criminology	4
Abnormal Psychology	2	Cultural Anthropology	2
Social Psychology	2		

A student may register for the complete program or may take any one or more of the courses providing he possesses the necessary prerequisite qualifications. The courses carry credit as indicated and may be used toward the requirements for the Associate in Arts degree in the field of social science.

Students completing the entire program of forty (40) semester hours will be awarded a certificate in the Family Institute.

Institute of Nations

The United States has assumed a dominant position in world affairs. Individually, however, we are unprepared to accept our responsibilities as world citizens. We are ignorant of the other peoples of the world, their histories and cultures, their social, economic, and political systems and problems. Our acceptance of other peoples as neighbors can come only when we can replace ignorance and mistrust with understanding and confidence.

The Institute of Nations presents an integrated program of courses concerning the "U. S. in the World Community." It is arranged to make world events intelligible; to stimulate a critical evaluation of newspapers and other news sources; to encourage an increased social participation and stimulate the full utility of the privileges of citizenship through an international understanding which is the only path to world peace.

The important current events that affect our present activities and our future well-being will be viewed in perspective with the social, economic, political, cultural, and geographic factors that led to their happening. They will be studied only in terms of major trends and movements, while history will be examined wherever it is necessary to make the present more understandable. Thus the programs will be of practical utility and interest to every citizen.

Program of Courses

Each course will consider a separate area where a natural division is evident for geographic, ethnic, political, or economic reasons. The areas to be included are those which have a current relationship to the United States in the World Community.

	Sem. Hrs.
The Soviet Union	8
Modern European History	4
Far East	4
The Middle East	2
Latin America	2
The U. S. and World Organization	4
U. S. History	4
History of American Foreign Policy	4

A student may register for the complete program or may take any one or more of the courses. The courses carry credit as indicated and may be used toward the requirements for the Associate in Arts degree.

Students completing the entire program of thirty-two (32) semester hours will be awarded a certificate in the Institute of Nations.

General Information

The Academic Year

The courses which comprise the several degree curricula and Institute programs described on pages 16 to 25 are offered through the College of Liberal Arts, the School of Business and the College of Education. In all three, the academic year is comprised of the Fall Term, the Spring Term, and the Summer Term.

The academic year for the *Evening College of Liberal Arts* comprises the fall and spring terms of twenty (20) weeks each and a ten (10)-week summer term. The courses are offered every evening throughout the week with classes scheduled for 6:30 to 8:00 and from 8:00 to 9:30. The starting and closing dates for the three terms are shown on the calendar on page 3.

The academic year in the *School of Business* is comprised of the fall and spring semesters of seventeen (17) weeks each, followed by a fourteen (14)-week summer term. Classes in the School of Business, in general, meet one evening a week for a two-hour session from 7:00 to 9:00 P.M. Courses are also offered on Saturday morning throughout the fall and spring terms. The occasional variations are clearly indicated in the course schedules prepared for each term. The starting and closing dates for each term are shown on the calendar on page 3. Courses offered through the School of Business are indicated by (†) throughout the catalog.

Courses offered through the *College of Education* will be available during the late afternoon and evening. Students should consult the schedule of course offerings for these courses as prepared by the College of Education for each term.

Application for Admission

Courses are scheduled to admit students at the beginning of each of the three terms. The applicant is required to file an application form setting forth his previous education and the name of one person to whom reference may be made concerning his character and previous training.

Upon receipt of the application, previous school records and references are obtained for review by the Committee on Admissions. The applicant is informed as to his eligibility for admission and is invited to visit the school for a personal interview at which time a program of courses is arranged.

An applicant seeking advanced standing credit should arrange to have a transcript of his previous college record forwarded to the Director of Admissions as soon as possible after the filing of his application.

Admission Requirements

Fifteen units are required for admission and must include three units (four years) in English and at least six units in foreign languages, mathematics, science, or social studies except that students planning to major in mathematics or science must present two units in algebra and one unit in plane geometry. The remaining units are elective from other secondary school subjects which are acceptable to the Committee on Admissions.

A unit is a credit given to an acceptable secondary school course which meets at least four times a week for periods of not less than forty minutes each throughout the school year.

The Department of Admissions reserves the right to require a candidate to be present for an examination in any subjects that it may deem necessary because of some weakness in the secondary school record.

Registration

The filing of the application for admission does not constitute registration. All students are required to register at the college and arrange for the payment of their tuition during the registration period. (See calendar, page 3.)

Advanced Standing

Advanced standing credit in the school may be obtained in one or both of two ways as follows:

By Transfer of Credit. Subject to the approval of the Committee on Education, credit may be given for work completed in other approved schools, colleges and universities. An applicant desiring credit by transfer should indicate his desire at the time of filing his application for admission. The applicant should instruct the Registrar of the institution of previous attendance to mail an official transcript direct to the College of Liberal Arts — Evening Division, indicating honorable dismissal, courses completed, credits and grades. A copy of the catalog of the institution from which the transfer is sought should accompany the application for advanced standing credit.

By Examination. 1. For credit: No advanced standing credit is awarded except for work previously completed in courses comparable to those offered at Northeastern University. Credit may be disallowed for work previously completed due to the remoteness of the time of study. These applicants, however, will be granted the privilege of taking an examination for credit.

2. For placement: Applicants who, as a result of previous training and experience, may be considered to possess sufficient knowledge of a subject will be allowed the privilege of taking a special examination in particular courses. No credit will be allowed but they will be granted the privilege of substituting another course.

The grade of 75% must be obtained in examinations for placement or for credit.

Residence Requirement

Every candidate for the Baccalaureate or Associate Degree must fulfill the residence requirement. The residence requirement is defined as the taking and satisfactory completion at Northeastern University, immediately preceding graduation, of 30 consecutive semester hours of work in courses; with the further provision that at least 10 of the 30 semester hours must be in the candidate's major field.

In the case of students who for causes beyond their control move outside of the reasonable commuting area of the school, and who have completed 100 or more semester hours of credit in courses, the Committee on Education will

entertain a petition to allow them the privilege of completing their degree requirements at some other approved school. Under no circumstances will a degree be awarded to any student who has completed less than 30 semester hours of credit in courses at Northeastern University.

Students attending certificate programs must complete in residence the full semester hour requirements of the programs in required courses or substitutions approved by the Dean.

Attendance

Attendance is required of all students at recitations and lectures continuously throughout the academic year.

No student will be permitted to take a final examination in a course who has been present at less than seventy per cent of the lectures. To be entitled to attendance credit, a student must be present at least one hour in a one and one-half hour lecture.

Term Tests

Two tests are regularly scheduled in each semester for all courses. These tests are regarded as part of the term or course work. Students failing to take the term tests for justifiable reasons may petition for a make-up privilege *within one week of the date of the test*. Make-up privilege will not be allowed to any student merely for the purpose of raising his test grade. A fee of $3.00 is charged for each make-up test.

Final Examinations

The general policies governing regular examinations are:

A final examination will be held at the end of the semester in each course unless an announcement to the contrary is made.

The minimum passing grade in a regular final examination is D.

Students who, for justifiable reasons, are unable to take a final examination may be allowed the privilege of a make-up examination upon petition to the Dean. This examination will be considered as the original examination for grading purposes. The fee for each make-up examination is $5.00.

The student who has received a passing mark in a final examination and in a course may not take another examination for the purpose of raising his grade unless he repeats the course in its entirety.

Condition Examinations

The following policies govern re-examinations:

Permission for taking a make-up examination is dependent upon the quality of the work which the student has done throughout the course and is a privilege which the Committee on Education may grant to students who have received an E grade or an Incomplete (Inc.).

The condition or make-up examinations are given on specified dates. Students should consult the school office for the specific dates of each examination.

Only one make-up examination in any given subject is allowed for the purpose of removing a conditional failure.

A make-up examination for purposes of removing a condition or an incomplete grade must be taken within the next school year. In such cases students may

take either the examination at the condition examination period or the final examination when next given if within a period of one year. A fee of $5.00 is charged for each examination taken out of course.

A minimum grade of 65% is required on each make-up examination unless a higher minimum is specified.

Whatever grade the student obtains on the make-up examination is credited as the final examination grade, but in no case can the final grade in the course be more than 70% except in the case of students who have been excused from taking the regular final examination.

Grades and Credits

The following system of grading is in use:

Superior Work, A; Above Average Work, B; Average Work, C; Lowest Passing Grade, D; Unsatisfactory Work, E; Failure, F; Incomplete, Inc.

Students receiving an E, or unsatisfactory work grade, in an examination or as a final grade in the course may remove the unsatisfactory grade by taking a make-up examination when it is next given, or at the time of the conditional examinations in September. The minimum passing grade of 65% is required on the make-up examination, unless a higher minimum is designated. In no case will a student taking a make-up examination be allowed more than a C for a final grade even though a higher grade may be obtained.

Students receiving an F grade in a course must repeat the course in its entirety, including term work, examinations, and attendance.

The policy is followed of mailing all grade and status reports to students instead of issuing these reports at the school office or over the telephone.

Credit for one-half of a full-year course is not generally given, and in any event only upon approval by the Dean in advance of beginning the course.

In order to qualify for a degree, title or a certificate, the student must maintain a general average of C for the entire program. This is not interpreted to mean that each course must be passed with a grade of C, but that the average of all courses must be at least C. Grades of courses credited by transfer or by examination are not included in computing averages.

Probation and Discipline

The Committee on Education, in dealing with students whose work in the school may be unsatisfactory, or whose conduct is such as to make it inadvisable for them to continue as members of the student body, considers each case upon its individual merits. The following general principles are kept in mind in handling such cases:

Students whose scholarship in any given year is unsatisfactory may be dropped from the school or may be placed on probation with the privilege of spending a year in review.

When a student is placed on probation, the probation is formally imposed for a definite time and can only be extended by approval of the Committee on Education.

This Committee has the authority to dismiss from the school or place on probation at any time or to strike off from the list of candidates for the degree any student whom it may deem unworthy either on account of unsatisfactory scholarship or for any great defect of conduct or character. The Committee may ask any student to withdraw from the school who is obviously out of sympathy with the aims and ideals of the school.

Outside Preparation

It is expected that students will devote on the average two hours to preparation for each hour spent in the classroom. It is to be expected that some courses will require more time for preparation than others.

Students are cautioned therefore to limit their registration to that course load for which they can be certain to spend required time. There is neither sense nor satisfaction in mediocre achievement.

Classrooms and Libraries

The classrooms are furnished with modern equipment and are thoroughly adapted to evening school work. Improvements in classroom facilities are constantly being made to meet the needs of the student body.

The reading rooms of the Library are open Monday through Friday from 8:45 A.M. to 7:30 P.M. They close at 12:00 NOON on Saturdays and are not open Sundays and holidays.

Textbooks and Supplies

The Northeastern University Bookstore is a department of the University and is operated for the convenience of the student body. All books and supplies which are required by the students for their work in the University may be purchased at the Bookstore. In addition, the Bookstore also carries a large number of general supplies.

Student Council

The social and extracurricular life of the school is in charge of the Student Council consisting of representatives from each class or school group. In addition to arranging for occasional social affairs, special lectures, and meetings, the Council represents the interests of the student body. The faculty and the officials advise with the Council in regard to school policies.

Notify the Office Immediately

Of change of address.

Of withdrawal from any course — otherwise the fee for that course will be charged.

Of withdrawal from the school, giving date of the last session attended.

Tuition, Fees and Scholarships

General Financial Information

Tuition and fees are not transferable and are refundable only as stated under "Refund of Tuition."

Checks and drafts for all charges are to be drawn to the order of Northeastern University.

Students are not permitted to attend class sessions or take any examinations or tests until they have paid their tuition fees or have made satisfactory arrangements for payments.

Students will not be advanced in class standing, or permitted to re-enroll in the University, nor will degrees be conferred until all financial obligations to the University have been met.

No certificate of honorable dismissal will be issued to any student who has not fully met his financial obligations to the University.

There are no auditors or auditor's rates in the College of Liberal Arts.

Matriculation Fee

The matriculation fee of $5.00 must accompany the initial application for admission to the undergraduate programs of the Evening Division. This fee is non-refundable.

Tuition

Tuition for all credit courses is charged at the rate of fourteen dollars ($14) per semester hour of credit. Charges for registration and tuition for special courses are at the rate and on the basis of payment specified for each course.

Students registering for courses in other schools of the University are charged the tuition rates and other fees effective in the departments in which they are enrolled.

Tuition for degree or certificate candidates for all credit courses is charged on the semester basis payable at the beginning of each semester. As a convenience, however, and unless otherwise requested, the tuition each semester is payable in two (2) installments; the second installment is payable on November 15 and March 15 in the first and second semesters respectively.

Tuition for an unclassified student registered in a special course is charged for the entire course and is payable in a single payment at the beginning of the course unless otherwise arranged.

Occasionally situations develop — usually beyond the control of the student — which make it difficult to meet the payments in the manner outlined above. Under such circumstances the student is advised to discuss his problem personally with the Student Accounts Office where a deferred payment agreement or one of the budget plans may be worked out. Such arrangements should be made before the end of the first week of the semester or within one week of the date of registration if the student enters late. Failure to take immediate action will result in a late payment fee.
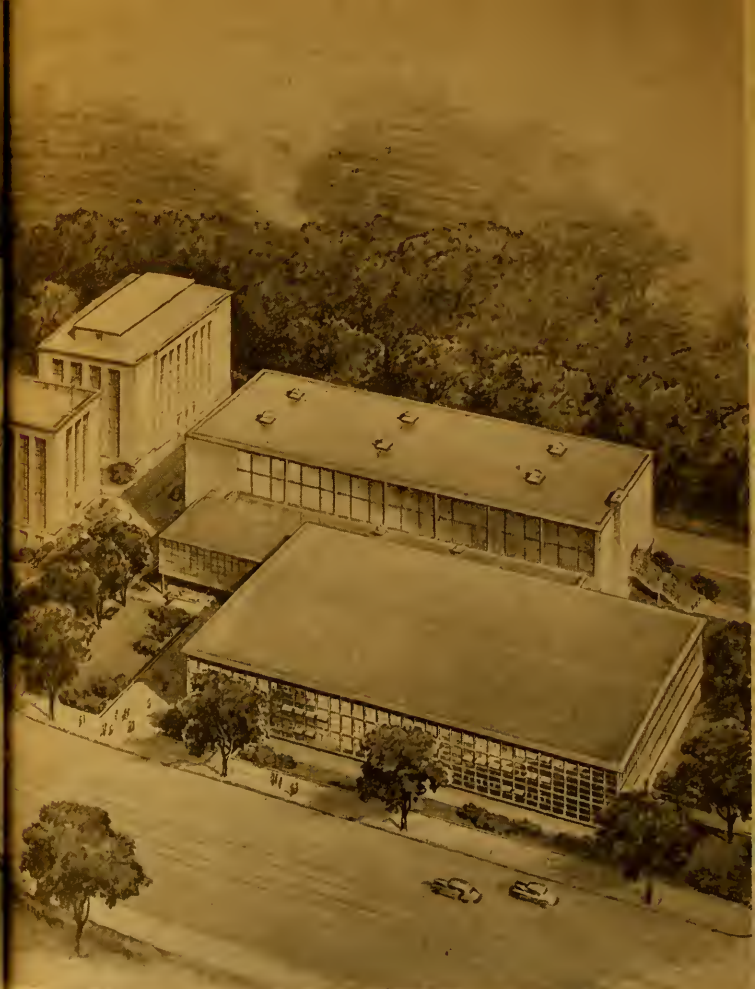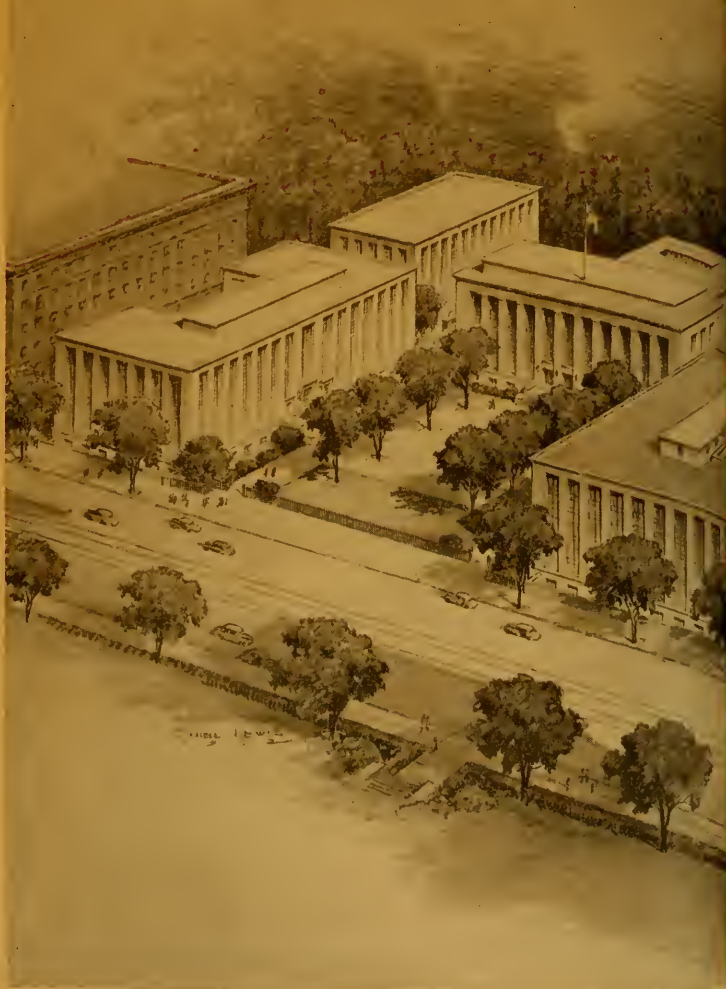
Northeastern University by the Architect

The facilities of Northeastern University are housed in the buildings shown above which include University Library, Science Hall, Student Center Building, Alumni Auditorium, Richards Hall, Gymnasium and Indoor Athletic Field. Not included in the drawing are the Building and the Greenleaf Building, which house classrooms and laboratory facilities.

Tuition Budget Payment Plans
Schedule of Tuition Payments Calculated on a Semester Basis

		PLAN A 12 S.H. Course Load	PLAN B 8 S.H. Course Load	PLAN C 6 S.H. Course Load
Payment Dates		Payments	Payments	Payments
	Sept. 15	*$34	*$26	*18
First	Oct. 15	34	22	17
Semester	Nov. 15	34	22	17
	Dec. 15	34	22	17
	Jan. 15	34	22	17
	Feb. 1	*34	*26	*18
Second	Feb. 20	34	22	17
Semester	Mar. 15	34	22	17
	April 10	34	22	17
	May 1	34	22	17

*Includes a non-refundable service charge of $2.00.

Tuition Underwritten by Employers

An increasing number of companies are underwriting in part or whole the cost of tuition of students in their employ. In such cases the student must furnish at the time of registration, or immediately thereafter, a purchase order covering his registration or a statement from an officer of his company certifying that the company is underwriting the tuition.

Late Payment Fee

Bills for tuition and fees are payable on or before Saturday of the week of issuance. A Late Payment Fee of $2.00 is charged for all students failing to comply unless special payment arrangements are approved by the Student Accounts Office.

Late Registration

Students are urged to register well in advance of the opening of the semester, since any student who registers after the first week of classes of the term is charged a Late Registration Fee of $5.00.

General Fees

A fee of $3.00 is charged for each make-up test, $5.00 for each conditional final examination or advanced standing examination. This fee must be paid on or before the date of the examination.

The University graduation fee, charged to those who are candidates for the Bachelor or Associate degree, is $20, payable on or before May 1st of the year in which the student expects to graduate.

Laboratory Fees

Chemistry — All students taking Chemistry are charged a Chemistry laboratory deposit of $15, payable in September. The unused portion of the deposit will be refunded after deductions are made for breakages, chemicals, supplies and non-returnables.

Biology — A laboratory fee of $15 is charged to all students enrolled in Biology. The unused portion will be refunded after deductions are made for base charge, breakages, supplies, specimens and non-returnables.

Refund of Tuition

Requests for refunds must be made at the time of filing the Application for Withdrawal at the school office. If the withdrawal notification is sent in by mail, the refund should be requested in the letter with reasons which necessitate the withdrawal. *No refunds will be granted to a student who voluntarily withdraws* or who has attended more than five weeks of the term for which payment has been made.

Refunds of tuition will be considered only in the following instances:

1. If, because of illness, a student is compelled to withdraw before the fifth week of the term, or
2. If a student who is regularly employed is sent out of town permanently by his employer, or
3. If the hours of employment of a student who is regularly employed are changed so as to make it impossible for him to continue in attendance, or
4. If a student is inducted into military service.

The Committee on Withdrawals will consider requests for tuition refunds only on the following bases:

1. That the application for withdrawal be made immediately after the student ceases attendance.
2. The request for refund is accompanied by an *acceptable* physician's certificate in the instance of illness, or by an *acceptable* employer's certification in the instance of a change in place or hours of employment.
3. Evidence of induction into military service.

For cases complying with the above, partial refunds on tuition for the semester may be allowed according to the following schedule:

	Refund to Student on	
Petition for Withdrawal Filed Within	*Regular Term*	*Summer Term*
One Week	80 per cent	80 per cent
Two Weeks	80 per cent	60 per cent
Three Weeks	60 per cent	40 per cent
Four Weeks	40 per cent	20 per cent
Five Weeks	20 per cent	0 per cent
After Five Weeks	0 per cent	0 per cent

The above does not include fixed or non-refundable fees or laboratory fees for which there is no refund allowed.

The official "Application for Withdrawal" form may be obtained in the school office. All refunds are made through the Student Accounts Office of the University. The refund procedure in such cases takes from three to four weeks. A check is mailed direct to the student for any refund to which he is entitled.

Description of Courses

COURSES to comprise a student's program may be selected from the offerings of the College of Education, the College of Liberal Arts, and the School of Business. Courses offered by the School of Business are indicated by a (†) preceding the course title. Students are requested to consult the catalog of the College of Education for course descriptions in that field.

The University reserves the right to withdraw, modify, or add to the courses offered, or to change the order of courses in curricula as may seem advisable. Not all courses are offered every year.

The University further reserves the right to withdraw in any year any elective or special course for which less than twelve enrollments have been received. Regular students so affected by such withdrawal will be permitted to choose some other course. In the case of special students, a full refund of all tuition and other fees will be made.

The University also reserves the right to change the requirements for graduation, tuition and fees charged, and other regulations. However, no change in tuition and fees at any time shall become effective until the school year following that in which it is announced.

The letter or letters immediately preceding the numbers indicate the classification of the course. All full-year courses will have mid-year examinations and course credit will be granted on a semester basis.

Accounting (A)

†A 1-2 *Introductory Accounting* — This course is designed to present basic instruction for those who may desire a background understanding of accounting principles or for those who may plan to enroll later in more advanced courses. Emphasis is placed upon proprietorship accounts, including books of entry, statements, business practices, adjustments, and an introduction to partnership accounts. Drill and practice work are required for proficient handling of simple accounting transactions.

(*No previous knowledge of bookkeeping or accounting necessary*)

5 semester hours credit

†A 3-4 *Intermediate Accounting* — A continuation of Introductory Accounting, treating with problems of the partnership and corporate forms of business entities. Accounts for a manufacturing business are introduced. In addition to the drill and practice work on accounting technique, a mastery of many accounting principles is required.

(*Prerequisite, A 1-2*)   *5 semester hours credit*

†A 13-14 *Managerial Accounting* — A study of the broad background of accounting and business transactions to enable the student to analyze and interpret intelligently financial statements and other accounting reports. The course demonstrates the use of accounting in management and financial control. Topics covered are the development of accounting fundamentals, preparation of financial statements, corporation and manufacturing accounts, evaluation of balance

sheet items, analysis and interpretation of financial statements and other trends, and the use of accounting as an aid to management.

(*No previous knowledge of bookkeeping or accounting necessary*)

5 semester hours credit

†A 31 *Analysis of Financial Statements* — This course embodies a study of the techniques used by management, creditors, investors, and regulatory authorities in the analysis and interpretation of financial statements for the purpose of establishing credit ratings, determining the investment value of a business, testing the efficiency of operations, and determining whether financial and operating policies, methods, and practices should be continued or changed. The student's ability to analyze, question, determine significant omissions, to criticize constructively, and to distinguish between inferences and facts is developed by extensive use of published corporate reports. The companies selected for study are in industries important to the New England economy, such as transportation, power, fuels, lumber, merchandising, textiles, electronics, machinery, paper, shoes, etc.

(*Prerequisite, A 13-14*)   *2½ semester hours credit*

†A 41-42 *Basic Federal Taxes* — This course provides a thorough basic coverage in the principles of Federal income taxes. A detailed study is made of the Federal income tax law and its application to the incomes of individuals, partnerships, corporations, and fiduciaries. Many practical tax problems are presented for study and solution.

(*Prerequisite, A 3-4 or A 13-14*)   *5 semester hours credit*

†A 43-44 *Advanced Federal Taxes* — This course is designed to prepare the student to handle the complicated tax problems arising in everyday business. To give the student experience in methods used in actual tax practice, he is required to study the provisions of the Internal Revenue Code, analyze numerous special tax problems, and solve them by applying relevant provisions of tax law. Solutions must be supported by citations.

(*Prerequisite, A 41-42*)   *5 semester hours credit*

†A 45-46 *Tax Planning* — An advanced course in corporate tax problems, covering tax advantages and disadvantages of the corporate form of organization; dangers of inadequate capitalization; compensation problems, including deferred compensation, bonus plans, and pension plans; problems of close corporations; the section 102 penalty; corporate reorganization and liquidation; expense accounts of executives; research and development expenses; and cancellation of indebtedness. A detailed analysis of real estate tax problems, including tax aspects of mortgages, lease agreements containing options to buy, sales and lease backs; also purchase and sale of a business, including covenants not to compete; survivorship purchase agreements; pointers on bad debts, worthlessness, and other business losses. Methods of effecting tax economies in connection with these problems will be stressed.

(*Prerequisite, A 43-44 or its equivalent*)   *5 semester hours credit*

†A 49 *Tax Procedure* — A course stressing the practical, everyday aspects of tax procedure. Among the matters to be covered are the following:

Recent reorganization of the Bureau of Internal Revenue: changes in procedure. *Working tools of tax practice:* the code, regulations and court decisions. *How to find the law of your case:* procedure in research, methods of presentation and proof. *Preparation of returns:* procedures in preparation which will minimize possibility of field examination of return. *The audit process:* what the agent is looking for when he examines the return, investigatory powers of the Bureau. *How to represent your clients most effectively before the various branches of the Bureau:* how to effect settlements at various stages. *Preparation of protests and briefs. Assessments of deficiency and collection of tax:* liens, their operation, effect and enforcement, Statute of Limitations. *How to handle refund claims:* preparation and negotiations with respect to claims for refund. *Closing agreement and compromises based on inability to pay. Taxpayer's rulings:* procedure for obtaining these and their effect. *What is the liability of the person preparing a tax return?*   *2½ semester hours credit*

Economics $\left(Ec\right)$

Ec 1-2 *Economic Principles* — The introductory course aims to provide the significant economic principles and facts about industry, labor, money, banking, the distribution of income to the factors of production, business fluctuations, and forms of social organization. Consideration is given to current economic problems, in relation to the basic principles and laws, and to their implications for individuals, business, and government, as well as society at large.

4 semester hours credit

Ec 3-4 *Economic Problems* — In this course the application of economic principles to some of the major economic problems of modern society is emphasized. The problems studied include consumption, protective tariffs and subsidies, labor problems such as unemployment and labor unions, and the business cycle, price stabilization, the agricultural problem, the relation of government to business, including control of monopolies and public utilities, insurance, public finance, and proposals for the remodeling and improving of the economic system.

(Preparation, Ec 1-2)   *4 semester hours credit*

†Ec 5-6 *Financing Business Operations* — The needs for capital in the production and merchandising of goods and services; the sources of long-term and short-term funds and their utilization form the basis for the introduction to finance as a basic function of business management. Credit instruments, trade credit, secured and unsecured loans, specialized forms of short-term financing and consumer credit are considered in the first semester. Money, the commercial banking structure, the Federal Reserve System, thrift institutions and other financial agencies and services as they relate to operations of the business firm form the basis of the second semester, which concludes with brief consideration of both international and public finance.

(Prerequisite, Ec 1-2; A 1-2; 3-4; or A 13-14)   *5 semester hours credit*

†Ec 7 *Statistics* — The objective of this course is to introduce students with no previous training in statistics to its practical use in analyzing problems encountered in business and industry. It presents the fundamental concepts underlying analytical method and serves as a prerequisite for advanced courses in statistics. Presented from the point of view of the business man, it is concerned with the nature and calculation of averages; measures of dispersion; measures of skewness, kurtosis, and normal curve analysis; an introduction to basic probability and its relation to sampling. Tabular and graphic presentation of data will be considered. A part of each session will be devoted to laboratory practice in the solution of problems. *2½ semester hours credit*

†Ec 8 *Statistics* — This course is a continuation of Ec 7 and introduces the student to the field of time series analysis. Among the principal topics considered are the measurement of secular trends by free-hand and mathematical methods; the measurement of seasonal fluctuations; cyclical fluctuations; the general nature and calculation of index numbers; and an introduction to linear correlation. A part of each session is devoted to laboratory solution of problems.
(*Prerequisite*, *Ec* 7) *2½ semester hours credit*

†Ec 9-10 *Business Planning and Research* — To assist business men to make more definite and more accurate business decisions through a broader understanding of the significant information and statistics regarding our economic system and its operations is the major objective of this course. Sources of information, strengths and weaknesses of principal measures of business activity, and the use of several widely accepted indexes in general business forecasting are a major part of the study, as well as sales forecasting, business cycle analysis, and the effects of the broadening relation of government policies upon the individual business firm. *5 semester hours credit*

†Ec 11-12 *Financial Policy and Planning* — This course includes a study of the corporate form of organization, the various types of securities utilized, and the financial problems invclved in promotion and expansion of enterprises, in mergers, in sale of properties, and in failures and reorganizations. Attention is devoted to the planning aspects of the corporation financial officer's job with respect to budgets, operating reports and their analysis. Policy matters such as executive compensation, dividend policies, pensions and profit-sharing plans are also dealt with.
(*Prerequisite*, *Ec* 5-6) *5 semester hours credit*

†Ec 13 *Investment Principles* — The characteristics of the entire range of securities from government bonds to common stocks form the foundation of this course as they relate to various types of investment programs. Sources of information, mathematics and mechanics of investment and the differing analytical approach to various industries are considered primarily from the viewpoint of the individual private investor interested in practical methods of capital preservation.
(*Prerequisite*, *Ec 11-12*) *2½ semester hours credit*

†Ec 15-16 *Applied Security Analysis* — This course is designed to acquaint the student with methods used by practicing security analysts in their studies of various industries and to provide practical information useful in future analysis

of companies operating in these industries. It includes review of basic prin-
ciples of Security Analysis; tools used by practicing analysts; analytical study of
various industries comprising our economy, including the major consumer goods,
capital goods, service industries, public utilities and railroads. Practicing analysts
who are specialists in their respective industries will comprise the faculty. These
instructors will develop the problems affecting their industries, the methods used
in appraising their outlook, and the approaches to the problems of analyzing
the securities of individual companies within these industries. A term paper is
required of each student, during the preparation and writing of which he is
assigned to a practicing analyst for technical assistance.

(*Prerequisite, Ec 14*)   *5 semester hours credit*

†Ec 17 *Public Finance* — Government policy in terms of public finance has
become of vital importance to all aspects of our economy. Vast emphasis is
placed by government upon the effects of government expenditures and taxation
as means of control. This course is specifically related to five factors: government
expenditures, fiscal administration, government borrowing and indebtedness,
taxation and other current revenues, federal-state fiscal relationships.

2½ semester hours credit

†Ec 21 *Economic Geography* — This course is concerned with the role of geog-
raphy, geology, and climatology in determining the centers of population, the
location of natural resources, and the development of agriculture and industry.
It considers their location in terms of their natural relationship to the flow of
world trade. The socio-economic principles that underlie the development of
resources in different countries and climates are emphasized. It also analyzes the
political-economic aspects of resource distribution and development in the form
of trade and world relationship.   *2½ semester hours credit*

†Ec 22 *International Economics* — This course attempts to analyze foreign
trade and finance in terms of current practices and theories. It discusses national
welfare and foreign trade; international accounting and what the balance reveals;
the making of international payments and documents used; the rate of exchange;
international equilibrium; foreign trade and the national income; principles
behind protection; trade control through the tariff, import quotas, exchange
control and their evaluation; international commodity agreements and commer-
cial treaties; monetary policy problems; the international gold standard; exchange
reserve standards; exchange stabilization fund; the shortage of dollars; the Inter-
national Monetary Fund; international investments.   *2½ semester hours credit*

Ec 23 *Managing Personal Finances* — The purpose of this course is to give help
to young men and women with the financial problems they face in charting wise
programs of handling their personal finances. It is introduced by a discussion of
money, its function, dollar value, and an appreciation of true values in life, using
money to achieve the same. The course continues with a consideration of the
following: expense control through budgeting; wise buying methods and policies
— charge accounts, installment buying; financial institutions for borrowing
money; protection against risk to person and property; methods of saving; the
place of life insurance in financial planning; owning a home; investing in se-
curities; trust funds, investment trusts; making a will; business fluctuations and
the planning of personal finances.   *2½ semester hours credit*

†Ec 118 *Money and Banking* — This course includes a brief but comprehensive survey of the institutional aspects of the monetary system and the banking structure in the United States. Emphasis is placed on the essential relationships among commercial banks, Federal Reserve System, and Treasury. The process of credit expansion is analyzed in terms of its impact on aggregate economic activity; and prominent theoretical interpretations of monetary and credit problems are explained, discussed, and evaluated. Discussion of contemporary and historically significant monetary policies and fiscal measures from both the domestic and the international point of view occupies an important place in the course.
(*Prerequisite, Ec 5-6*)   *2½ semester hours credit*

†Ec 119 *Business Fluctuations and Forecasting* — This course is designed to present a review of the primary theories of continuing disequilibrium in a capitalistic economy, a brief survey of the statistical history of fluctuations in the level of economic activity, and a careful investigation into contemporary analyses of income and employment determinants. The rudiments of econometric model-building are introduced, and several aspects of forecasting (techniques and results) are assayed. Stabilization programs and policy questions are explained, debated, and evaluated.
(*Prerequisite, Ec 7-8*)   *2½ semester hours credit*

†Ec 200 *Comparative Economic Systems* — This course attempts to bring into focus the various schools of economic thought as they might relate to our current economy. It presents an examination of the evolution of economic thinking in terms of the "climate" or environment out of which each developed, placing major emphasis on our modern economic concepts directly affecting the production and distribution of economic goods; the increasing important relationship of governmental policy to industrial activity, etc.
                                                       2½ semester hours credit

†Ec 201 *History of Economic Thought* — A survey of the nature and origin of economics and the various schools of economic thought; an examination of the evolution of economic thinking up to the present day; careful attention is paid to the historical development of our modern economic concepts and the manner in which those concepts tie directly to current industrial problems involving the production and distribution of economic goods; the role of increasing importance played by the relationship of political policy to industrial activity.   *2½ semester hours credit*

†G 202 *Case Studies in Business Enterprise* — A survey of the history of industrial endeavor and business activity from its rudimentary stages to the present day, with careful attention to the evolution of business management, noting successful and unsuccessful examples by case history; discussion of the role that business plays in shaping our economy and society as well as the effect of our social and economic order upon the business firm; special emphasis is given to the control of business by the state, monetary policies, public finance, the rise of banks, corporations, commodity and stock exchanges, and their regulation and control; the rise, causes, and effects of financial and commercial crises and depressions; a close tie-in of the economic thinking that prevailed behind the visible aspects of economic and industrial activity.   *2½ semester hours credit*

English (E)

E 1 *English I* — The aim of this course is to help the student attain competence in the understanding and evaluating of modern literature and in written expressions. It includes a review of the structural essentials of the English language, various written assignments, and the study of essays and informational articles.
2 semester hours credit

E 2 *English I* —Continuing the general purposes of E 1, this course proceeds to a study of the special problems of description and narration, and to a critical reading of poems, short stories, and plays.   *2 semester hours credit*

E 3 *Advanced Composition* — The technique of writing in the shorter literary form will be studied in detail and applied systematically toward the building up of the student's individual style. A part of the time each week will be devoted to personal conference between the student and the instructor.
  (*Prerequisite, E 1-2*)   *2 semester hours credit*

E 4 *Advanced Composition* — The continuation of the technique of writing and the building up of an individual style for the student.
  (*Prerequisite, E 5*)   *2 semester hours credit*

†E 5 *Effective Speaking* — This course offers practical training in the preparation and presentation of the various types of speeches. The instruction is planned to eliminate defects of voice, posture, and delivery, and to develop in the student an ability to speak easily, naturally, and forcefully. Continued practice in impromptu and extempore speaking, organization of material, consideration of the audience, and vocabulary building form the basis of the course.
2½ semester hours credit

†E 6 *Conference Leadership* — The management of modern business is conducted to a large extent through the use of conferences. The objective of this course is to present techniques basic to group leadership. It provides instruction in the planning, participation and leading of conferences. Classes are limited in size to allow regular and frequent participation by students. The conference topics are carefully designed so that the discussions are means of disseminating very worthwhile information regarding business management problems.
2½ semester hours credit

†E 9-10 *Industrial Journalism* — Basic news gathering and writing. Trade publications and their functions. Horizontal and vertical coverage. Writing for business papers. House organs — internal and external. Assignments and deadlines. Copyrights and credits. Publicity vs. Propaganda. Reproduction processes. Use of color. Preparation of manuscript for printer.   *5 semester hours credit*

†E 11 *Public Speaking — Parliamentary Procedure* — This course is designed to train students in public speaking and parliamentary procedures. In content the course augments training in public speaking by adding those speech situations unique to active participation and leadership in organizations whose programs are educational, civic, social, fraternal, veteran, or labor, and whose functions as deliberative necessitate observance of basic parliamentary procedure in keeping with by-laws, constitutions, or charters. Robert's Rules of Order, Revised, is the parliamentary text used.   *2½ semester hours credit*

E 12 *Reading Skills* — This course, which is one part of the course E 14 Speed and Comprehension in Reading, is devoted primarily to the development of correct reading techniques which lead to the ability to read faster with a higher degree of comprehension. Exercises for improving basic speed and comprehension include work with tachistoscope and films. Special attention is given to analytical reading and the improvement of study habits. *1¼ semester hours credit*

E 13 *Vocabulary Development* — This course is designed to assist the student in developing an adequate vocabulary and in improving his ability to use this increased power of words for more effective presentation of ideas. It includes the important aspects in the development of the English language, how it has drawn from many other languages, important roots, prefixes and suffixes, antonyms for variety and force of expression, etc. E 12 is not a prerequisite for E 13, although one supplements the other. *1¼ semester hours credit*

E 14 *Speed and Comprehension in Reading* — The ability to read well is a skill of considerable value to students and to those in professional practice. Efficiency can generally be improved by analysis with subsequent substitution of good for bad reading habits. Special equipment for instruction and drill exercises are used to increase reading rate and comprehension. Methods to improve study habits and to develop an effective vocabulary are included. *2½ semester hours credit*

E 15 *Survey of English Literature* — A survey of English literature to 1800. After a brief study of the social and political background of each literary period, the writing of the period is considered, and the more important writers are studied and read in detail. The purpose of the course is to give the student an appreciation of English literature as a whole, and an intimate knowledge of its major figures. *2 semester hours credit*

E 16 *Survey of English Literature* — A survey of English literature from 1800 to the present century. The outstanding writers are read, studied, and related to the general background of nineteenth century England. The purpose of the course is to give the student an understanding of the writers who contributed most to the formation and development of modern literature in England.
2 semester hours credit

E 25 *American Literature to 1860* — A survey of American literature from colonial times to the triumph of the transcendental movement in New England. The work of Bryant, Irving, Cooper, Poe, Emerson, Thoreau, Lowell, Holmes, Longfellow, and Melville will be emphasized. *2 semester hours credit*

E 26 *American Literature After 1860* — Continuing E 25, the course will consider the rise of realism after the Civil War, the development of American humor, the appearance of local color writers, and modern trends since 1900.
2 semester hours credit

E 31-32 *Western World Literature* — This course is devoted to great books that have influenced mankind. Each assigned text is presented with sufficient reference to its national background to provide topical understanding but without prejudice to its primary significance as memorable literature, the product of the creative spirit of man. The readings begin with the ancient Greeks, continue through the Middle Ages to the Renaissance, and conclude with selections from

prominent writers of the seventeenth, eighteenth, and nineteenth centuries. The student begins his reading with Homer's *Odyssey;* he studies the dramatic poetry of fifth-century Athens; he makes the acquaintance of Dante and Chaucer and then concentrates on the tragedies of Shakespeare; finally he endeavors to do justice to the talents of such relatively modern authors as Moliere, Rousseau, Goethe, Hawthorne, and Melville. In no sense comprehensive, this course introduces him to only a few of the great achievements in literature; but it is offered in the conviction that the problems and challenges of life can be profitably investigated in the poetry and prose of exceptional writers.

4 semester hours credit

Fine Arts (F)

F 1-2 *History of Art* — This course is designed primarily to develop an appreciation of art and its contribution to the cultures of western civilization. As a survey course, it begins with the contributions of Ancient Egypt, Greece, and Rome, and proceeds through the early Christian and Medieval Periods and the Renaissance to the more modern developments in European and American architecture, sculpture and painting.   *4 semester hours credit*

Government (G)

G 1-2 *American Government and Politics* — The study of our National Government with respect to its organization and function; its powers and limitations under the Constitution; its legislative, administrative, and judicial machinery under the party system of government and bureaucracy. It continues with a more detailed study of the relationships of our federal, state, and municipal governments, including an analysis and comparison of the various state governments and types of municipal government with respect to state and local agencies for carrying out the executive, legislative, and judicial functions of government in a democratic country.   *4 semester hours credit*

G 3 *Comparative Government* — This course examines the political structure of major contemporary democratic states. It concerns the nature and mechanics of political democracy in England and the Commonwealth Nations, France, and other continental democracies. The course surveys the constitutional development, parties and elections, legislative and executive responsibility, cabinet governments, public administration, legal system, local government, and current political problems and policies in the above named states.

(*Prerequisite, G 1-2*)   *2 semester hours credit*

G 4 *Comparative Government* — This course examines the political structure of existing totalitarian states with special emphasis on the several aspects of Marxist concepts of government as exemplified in Russia, China, and with reference to Fascist concepts of government practiced prior to World War II in Germany and Italy. Reference is made frequently to older forms of autocratic government.

(*Prerequisite, G 3*)   *2 semester hours credit*

G 8 *Modern Political Theory* — A critical study is made of the major developments in political theory since Bentham, with special reference to the influence of these developments upon American politics and political institutions. Attention is paid to the modern conflict between the democratic and the totalitarian conceptions of the state. *2 semester hours credit*

G 14 *American Politics and Political Parties* — This course deals with democracy at work under the American system of political parties. It is introduced by a consideration of the various groups such as sectional, business, labor, farmer, racial, religious, veteran, etc., which contend for power through our democratic processes; the techniques used by these pressure groups such as lobbies, propaganda, education, financial pressure, etc. The two-party system, with the history, platform, and policy of each, is analyzed and discussed. The reasons and relative successes of Third Party attempts from the early Populists to the Progressives is considered with the national minority parties and the state party groupings. The course is concluded by giving attention to state and local politics and the electorate in an attempt to determine why people vote as they do.
2 semester hours credit

G 15 *American Foreign Policy* — This course concentrates on the role of the United States in world politics, principally since the end of World War II. The history of American foreign policy since 1775 serves as a background for understanding present policy. An analysis of the governmental mechanism for the conduct of United States foreign affairs, fundamental factors affecting American foreign policy and the major problems confronting the United States receive stress.
(Prerequisite, G 1-2) *4 semester hours credit*

G 16 *Current Political Issues* — This course will deal with the major political issues before the American people today with the suggestions made by various groups to meet these issues. An attempt will be made to present all points of view, and to show the student how to recognize them in local and national newspapers and magazines. Part of each week will be spent in an analysis of current issues as seen in Republican and Democratic news organs from several different viewpoints, and assignments will be made from these publications as well as from textbooks. Controversy and debate will be encouraged.
2 semester hours credit

G 20 *International Politics* — This course, concerned with politics among nations, is primarily devoted to the aspects of international relations working toward a world community enabling the member nations to live in economic and political peace and harmony. It is introduced by a study of the origin and development of the State System and extends into the field of international politics as a struggle for power, considering such topics as the balance of power, international law, sovereignty, international morality and public opinion. This leads into a discussion of the "problems of peace" concerning such topics as disarmament; collective security — alliances; attempts at international government such as the Holy Alliance, the League of Nations, the United Nations, and other alliances. The course concludes by focusing attention on the international relationships between the United States and Soviet Russia wherein the policies

of "Containment," the Atlantic Pact and the Truman Doctrine, economic aid through E.R.P. and Point Four, and the "struggle for the minds of men" are discussed.   *2 semester hours credit*

†L 16 *Government Controls in Business* — A study of the economic and political relationships which exist between business and government with particular reference to the Sherman Act and Anti-Trust Laws; Securities and Exchange Commission; Interstate Commerce Commission; regulation of public utilities; the Co-operative Movement; the Social Security Act; government and labor; business regulation by taxation.   *2½ semester hours credit*

†PA 37 *Municipal Finance* — This course is basically concerned with the financial structure of a municipality, its sources of revenue, budget preparation, temporary and long-term financing to meet operational needs; development and analysis of debt statements to determine the community's fiscal ability to pay. The course includes discussion of the general laws governing municipal financing; the money markets, their operations and effect upon municipal financing; bond issues, average maturities and coupon rates; credit ratings; tax title liens, etc.
2½ semester hours credit

†PA 39 *Techniques of Municipal Management* — The course introduces the student to a basic understanding of the city manager, his job qualifications and problems. It discusses the questions of organization and reorganization, personnel policies including job analysis and evaluation, and considers individually the several major areas of responsibility as follows: finance, budgetary control, cost accounting, debt administration; legal regulatory practices; public health and safety, sanitation; welfare and charities; public services, schools, hospitals, libraries, recreation, utilities; fire and police protection; interdepartmental and public relations; planning and research.   *2½ semester hours credit*

†PA 40 *State and Local Relations* — The objective of this course is to explore the areas of operation wherein the municipality has a close working relationship with the state. It includes a careful analysis of the executive, judicial, and legislative branches of the state government, emphasizing their individual functions, duties, and responsibilities. It is particularly concerned with the legislative processes and procedures as they affect municipal government as well as such phases of administration as state, federal and local taxation; distribution of state funds in forms of grants-in-aid, and shared taxes; state and local welfare; school aid, etc.   *2½ semester hours credit*

†PA 43-44 *Council-Manager-Public Relations* — An historical development of municipal government leading to the more recent city-manager form. The advantages and disadvantages of each are discussed in terms of executive administration. The course considers the municipal manager in terms of his operating relationships and responsibilities to the council and other elected boards and enters into the broader field of public relations including administrative reports and reports to the public.   *5 semester hours credit*

History (H)

H 1-2 *History of Civilization* — This is primarily a course in Ancient Classical Civilization. Introductory lectures deal with the beginnings of civilization and the contributions of Egypt, Babylonia, and Syria. More detailed work is done in Greek and Roman history, the rise of Christianity, the barbarian invasions of the Roman Empire, and the origins and growth of Islam.

4 semester hours credit

H 3-4 *History of Civilization* — This course deals with the history of the Middle Ages, the growth of the monarchies in Europe, the development of constitutional government, the Renaissance, the doctrines and politics of the Protestant Reformation, the economic and the industrial revolution, the growth of science and industrialism, and the origins of the World War.

As in H 1, equal weight is given to political, cultural, and economic history.

4 semester hours credit

H 9 *The United States to 1865* — This course is an interpretation of the events which shaped the American nation to the Civil War. The course stresses political history and makes use of social, intellectual, and economic influences in interpreting political events.

2 semester hours credit

H 10 *The United States Since 1865* — This course revolves chiefly around the transition of American thought and action resulting from the replacement of the Newtonian static world by the Darwinian growing world. Reconstruction, third party protests, the money question, Progressivism and New Dealism, as well as the emergence of the United States as the dominant world power receive stress.

2 semester hours credit

H 11 *Recent American History* — The contending political, economic and social forces in American domestic history of the Twentieth Century and America's rise to world leadership are the main themes of this course. This takes the student from McKinley laissez-faire through the Fair Deal to the Eisenhower administration, and from the emergence of the United States as a world power in the early part of the century to its present position of dominance.

2 semester hours credit

H 13 *English Constitutional History* — A study of the origin and development of the English Constitution up to 1485. Special emphasis is placed on those institutions and concepts that form the background for American constitutional history. The important differences between the American and English constitutions are stressed. This course is important for those who intend to study law.

2 semester hours credit

H 14 *American Constitutional History* — An introductory course to the history and principles of American constitutional law. It is designed to give the student an understanding of case-law and the significance of the courts in the American system of government. Among the special topics covered are the power of the Supreme Court to pass upon statutes, the relation of national and state powers, civil rights, and the Commerce clause. Highly recommended for students planning to study law.

2 semester hours credit

H 16 *Social and Economic History of the U. S.* — The social and economic development of the United States is traced from the colonial period to the present with special emphasis upon the period since the Civil War. Stress is laid upon the importance of economic factors and social changes in our history in the description of the development of manufacturing, agriculture, domestic and foreign commerce, finance and banking, transportation and labor organizations.

2 semester hours credit

H 19-20 *English History* — This course develops three trends of importance in ancient and mediaeval England, namely, relationships between church and state, development of nationalism from feudalism, and the origin and development of the English constitution. It further studies in modern England the rise of cabinet parliamentary government, the Newtonian and Darwinian intellectual revolutions, the agricultural and industrial revolutions which set the stage for England's *Age of Reform;* all of which formed the background for the emergence of England as a socialist democracy. *4 semester hours credit*

H 21 *Modern European History 1815-1914* — This course deals with Europe during a century of comparative peace but tremendous social change. After examination of the period of reaction following the Congress of Vienna, attention shifts to those forces transforming European society — especially the Industrial Revolution and Nationalism. The course places special emphasis upon such intellectual movements as Liberalism and Socialism and concerns itself with the various social, economic, and political factors which led to World War I.

2 semester hours credit

H 22 *Recent European History* — The contemporary era of conflict since 1914 is treated in this course. A discussion of Darwinian concepts which influence the Twentieth Century is followed by a detailed study of the varied applications of these ideas in the major European states. The course deals briefly with military aspects of both world wars and with postwar attempts to secure lasting peace. The Soviet Russian regime and basic Communist beliefs are examined in detail to provide an understanding of contemporary world developments.

2 semester hours credit

H 23-24 *The Soviet Union* — This course will concentrate on the rise of Marxist and Communist ideas in Europe, the nature of Marxist theory, the development of the Bolshevik Party and Leninism in Russia, the Russian Revolution, the Civil War, the New Economic Policy, and the development of social, economic, and political institutions in the Soviet Union to the present day. The main trends in Soviet foreign policy will be introduced. *4 semester hours credit*

H 25-26 *The Soviet Union*—This course deals primarily with Soviet foreign policy and World Communism. It will deal exhaustively with the so-called "seven periods" of Soviet foreign policy: the Comintern period, the period of retrenchment and resurgence in the twenties, the growth of Fascism and the resulting Popular Front, the Nazi-Soviet Alliance, the War Front of 1941-45, and the growing conflict of the postwar period. Much attention will be paid to the workings of Communist parties in Europe and Asia, as well as in the United States; to the phenomenon of Titoism; and finally to a discussion of the Cold War, Korea, China, and possible alternatives of American foreign policy today.

4 semester hours credit

H 27-28 *Modern India and the Far East* — This course concerns twentieth century India and the Far East, their problems and basic civilizations. The social and religious aspects of Hinduism, Muslim communalism, economic and population problems, and aspects of British imperialism form the background for the study of Gandhi's non-violent war of independence. Basic Chinese philosophy, the rise and influence of Confucianism, Buddhism and its influence, Chinese and Japanese social and economic development precede a detailed study of the Chinese struggle against foreign imperialism which is depicted against the backdrop of the Japanese-American quarrel over the Open Door. The communist victory in China is seen as the result of clever Russian use of European and Japanese imperialism in China and American diplomatic errors in the Far East.
4 semester hours credit

H 29-30 *Latin American History* — The course begins with a study of pre-Conquest America and of the European background of Spanish and Portuguese colonization of the new world. The course continues with a study of the forces that give rise to the Wars for Independence, the founding of the new nations, and the rise of caudillism. Significant political and cultural developments and international affairs, especially with the United States, are given careful consideration.
4 semester hours credit

Law (L)

†L 13 *Law I* — Contracts: nature, kinds and formation of contracts; essential elements; form and interpretation of contracts; breach, remedies and damages. Agency: nature, purpose and formation of agency relationship; rights and duties of principal and agent, scope of agent's authority; rights and duties of principal and third persons; termination of agency. Employer and employee: compensation laws; duties of master; contributory negligence doctrine; injuries to third persons.
2½ semester hours credit

†L 14 *Law II* — Negotiable instruments: bills, notes and checks; requirements of a negotiable instrument; negotiation; liabilities and defense of parties; procedure upon dishonor; discharge. Bailments: nature and kinds; rights and duties of parties; carriers; documents of title. Sales: nature of sales contracts; warranties; transfer of title; rights and remedies of seller and buyer. Insurance: formation and function of insurance contract; kinds of policies; legal phases of life, property and other insurance. Suretyship: rights of the surety and the guarantor; rights and duties of the creditor; defenses of the surety and guarantor.
(Prerequisite, L 13) *2½ semester hours credit*

†L 15 *Law III* — Partnerships: nature, kinds and formation; rights and duties of partners; partner's authority to bind firm; relation of partners and third persons; dissolution and winding up. Corporations: nature and creation; charter; powers, rights and liabilities; nature and kinds of capital stock; rights and liabilities of stockholders; directors and officers. Mortgages: rights and duties of mortgagor; rights and duties of mortgagee; rights after default. Property: landlord and tenant relationship; classification of tenancies; rights and duties of

landlord; rights and liabilities of tenant. Bankruptcy: Federal Bankrupty Act; acts of bankruptcy; adjudication; rights and duties of bankrupt; unsecured, secured and priority claims; extensions, compositions, and other debtor-relief provisions; discharge.

(*Prerequisite, L 13*) *2½ semester hours credit*

†L 16 *Government Controls in Business* — A study of the economic and political relationships which exist between business and government with particular reference to the Sherman Act and Anti-Trust Laws; Securities and Exchange Commission; Interstate Commerce Commission; regulation of public utilities; the Co-operative Movement; the Social Security Act; government and labor; business regulation by taxation. *2½ semester hours credit*

Mathematics (M)

M 1 *Algebra* — Proceeding from a rapid review of the fundamental operations of Algebra, the work continues with a thorough study of fractions, functions, linear and quadratic equations, equations in quadratic form, graphs, exponents, complex numbers, binomial expansion, variation, and equations of higher degree than the second. *2½ semester hours credit*

M 2 *Trigonometry* — This course includes the solution of all triangles by both natural and logarithmic functions, identities, radian measure, principal values and the solution of trigonometric equations. Particular attention is given to the applications of Trigonometry to engineering practice.

(*Prerequisite, M 1*) *2½ semester hours credit*

M 3 *Analytical Geometry* — This course consists of a study of the straight line, circle and conic sections, using rectangular cartesian co-ordinates only; also the graphs of trigonometric, logarithmic, and exponential equations.

(*Prerequisite, M 1-2*) *with M 5, 2½ semester hours credit*

M 5 *Differential Calculus* — The work in the course consists of differentiation of algebraic, trigonometric, exponential, and logarithmic functions, both explicit and implicit; slopes of curves; maxima and minima; derivatives of higher order; velocity and acceleration in rectilinear motion.

(*Prerequisite, M 3*) *with M 3, 2½ semester hours credit*

M 6 *Integral Calculus* — This course deals with integration as the inverse of differentiation as well as the limit of summation. The topics covered are methods of integration; use of integral tables; definite integrals; areas in rectangular co-ordinates; length of curves; areas of surfaces of revolution; volumes of solids of revolution; multiple definite (iterated) integrals; centroids of plane areas; moment of inertia.

(*Prerequisite, M 5*) *2½ semester hours credit*

Modern Languages (ML)

ML 1-2 *Elementary French* — A beginner's course stressing the essentials of grammar, practice in punctuation, and progressive acquisition of a basic vocabulary with idiomatic expressions. Written and oral exercises are based upon simple French prose. The course develops into the reading of more difficult work accompanied by practice in conversation. *4 semester hours credit*

ML 3-4 *Intermediate French* — This is a continuation of Elementary French using texts of average difficulty with oral and written exercises and more complete consideration of idioms. Emphasis is placed upon the acquisition of reading and conversational ability. *4 semester hours credit*

Philosophy (Ph)

Ph 1 *Introduction to Philosophy* — This introductory course combines the historical and systematic approaches to the subject. The historical treatment includes a survey of the chief philosophers and the development of basic philosophical ideas. The systematic treatment presents the several types of philosophy, such as realism, materialism, idealism, and pluralism. The place of philosophy is considered in its relation to ethics, religion, and natural sciences. The course both acquaints the student with facts about philosophy and trains him to think philosophically. *2 semester hours credit*

Ph 2 *Problems of Philosophy* — The chief systems of thought are applied to what may be termed the persistent problems of philosophy. The problems are to be found in the fields of epistemology, teleology, and metaphysics. The following topics suggest representative problems which will be studied: the relation between mind and body, the nature and extent of freedom of the will, the validity of knowledge, and the bearing which the more recent views in physics and psychology have upon related philosophical problems.
(*Prerequisite, Ph 1*) *2 semester hours credit*

Ph 3 *History of Ancient Philosophy* — A survey of the rise and development of Western scientific and philosophical thought and its influences from classical Greek beginnings to medieval times, with special emphasis on great trends, schools, and thinkers, as the Sophists, the Eleatics, Atomists, Plato, Aristotle, the Epicureans, the Stoics, the later Skeptics, Neo-Platonists, and early Christian philosophers. *2 semester hours credit*

Ph 4 *History of Modern Philosophy* — A study of the great philosophical minds and their intellectual climates since the Renaissance. Comparison of ancient, medieval, and modern scientific and philosophical objectives, methods, and outlooks on man, culture, and nature. Particular attention to the writings of Bacon, Descartes, Hobbes, Spinoza, Locke, Berkeley, Hume, Kant, Hegel, and others, as well as to their influence on the contemporary Western milieu and treatment of recurrent philosophical problems confronting man through the ages.
2 semester hours credit

Ph 5 *Philosophy of Art, Aesthetics* — An examination of the nature, status, and function of art and beauty in their various forms in life. The relationship be-

tween the artistic-aesthetic and other human values and activities. Contrast between the practical, intellectual, and aesthetic impulse and attitude. Classical theories concerning art and the aesthetic experience. The problem of taste, standards of criticism, and objectivity of the aesthetic judgment. The arts, the artist, and society.   *2 semester hours credit*

Ph 6 *Philosophy of Religion* — A philosophical evaluation of religious experience, problems, beliefs, values and of their relationship to man's experience in its totality and to his needs, aspirations, and destiny. Discussion of modern conceptions about the Deity, good and evil, meaning and purpose in life and the physical world, human personality and freedom, immortality of the soul, and prayer and worship. The bearing of views and problems in modern science, philosophy of nature, theory of knowledge, ethics, aesthetics and general theory of value on relevant phases of religious experience and belief.

2 semester hours credit

Ph 7 *Principles of Social Ethics* — This course treats, concretely and analytically, such moral problems as human motives and conduct, egoism and altruism, implications of modern psychological and sociological theories about man and society, the meaning of good and evil, right and wrong, the role of customs and tradition, conscience, obligation, law, responsibility, freedom, and determinism. It evaluates critically the teachings of the major ethical schools, presents classical formulations of the good life, and explains the nature of the moral judgment and the ethical standard, and their relationship to economic, political, legal, religious, and other influences, values, and institutions.

2 semester hours credit

Ph 8 *Problems in Social Ethics* — A continuation of Ph 7, including an analytical, critical review of ethical data and theories in an attempt to analyze concrete moral situations involving the individual, the family, business and industry, the professions, government and politics, labor unions, education, etc. The underlying twofold aim of the course is to acquaint the student with the essential principles of reflective moral thinking and their applications to his own personal life and in his role as a citizen.   *2 semester hours credit*

Ph 9 *Logic I* — This is an introductory course in the art of correct thinking and effective discourse. It aims to establish and inculcate the laws of correct reasoning, enabling the student to analyze effectively types of argument or discourse. Fallacies resulting from semantic confusion and methodological error are studied. The course includes exercises in the structure and logical relations of propositions, types of deductive reasoning, and other thought processes used to obtain clear verbalization.   *2 semester hours credit*

Ph 10 *Logic II* — This is a continuation of Logic I including the limitations of deductive reasoning; nature of truth, proof, and their relationship to validity; inductive versus deductive procedures; the rationale of beliefs, common sense, and common practices; the scientific spirit and attitude, inductive procedures, and proof, argument or verification in the physical and social sciences; judgments of fact and judgments of value; the testing of evaluative judgments; the functions and relationships of deduction and induction, formal and factual reasoning.

2 semester hours credit

Psychology (Ps)

Ps 1-2 *General Psychology* — This course presents the major concepts from most areas of psychological investigation. Emphasis is placed upon the experimental approach to the study of behavioral data including growth and development, learning, perception and motivation. It considers the sensory basis of response, individual and group differences, mental testing, attitude formation and personal adjustment. *4 semester hours credit*

Ps 3-4 *Psychology of Personality* — A systematic study of formal personality growth. Approaches to the understanding of personality are made through a review of the physical, mental, and emotional development of the individual and of the social influences upon him. Several of the more prominent theories in the field are considered and some case material is presented.
4 semester hours credit

Ps 5-6 *Abnormal Psychology* — The study of personality deviants. Attention is directed to the historical development of the field with emphasis upon the development of theories of abnormal behavior and their classification, the rise of institutional care of the mentally ill, and the beginnings of humanitarian concepts of deviancy. *4 semester hours credit*

Ps 7-8 *Social Psychology* — A study of the psychological principles underlying human relations with emphasis upon motivation, nature and development of groups, social movements and institutions, antisocial behavior, social controls, leadership, co-operation, war, propaganda, and prejudice. In addition, the course seeks to elucidate the methods and techniques which yield trustworthy data regarding social phenomena. *4 semester hours credit*

†IR 3 *Psychology of Group Dynamics and Leadership* — Considerable study has been given recently to the problems of people acting together in groups. This course will acquaint the students with the results of the latest research concerning certain aspects of this study which relate to morale, supervision, incentives, and group decision procedures. It has as an objective the development of leadership skills by providing insights concerning the behavior of individuals in the group pattern. The principles of group dynamics will be discussed and demonstrated. The case method of instruction will be used in part to clarify the application of the principles. *2½ semester hours credit*

†IR 5 *Psychology for Business and Industry* — Business psychology is the study of predicting and influencing human behavior in business. It provides an understanding of man's mental life, of how the individual and the group behave and are influenced in their behavior, and of how the business man may predict and control his own behavior and that of those with whom he works. The study and analysis of the student's own personal problems and behavior constitute a valuable and interesting phase of the course. *2½ semester hours credit*

†IR 6 *Training Methods for Business and Industry* — Subjects covered range from principles and methods of effective "on-the-job" training to the handling of formal or informal training groups. The objective is to provide a thorough grounding in the psychology of learning; techniques of effective teaching; personality qualifications for successful training; a review of job instruction training

(J. I. T.) and job relations training (J. R. T.); use of the case analysis method; role playing; training tools; visual aids; the value of example and demonstration; methods of analyzing and meeting training needs; the principles and practices of organizing and administering a training program; follow-up procedures to insure results; class projects to provide practical application of material covered in the course. *2½ semester hours credit*

†IR 15 *Employment Testing* — Selection and placement procedures usually comprise several steps, including the interview, psychometric testing, references, etc., all of which are fitted together to form an over-all judgment. This course is concerned with tests used in business and industry to determine aptitudes, personal characteristics and qualifications for employment, proper job placement, counselling, promotion, special training, supervisory or executive potentialities. It discusses tests in terms of type and purpose, test characteristics, test construction, test interpretation, use and limitations of testing.
2½ semester hours credit

Sociology (S)

S 1-2 *Principles of Sociology* — Facts and principles basic to a general knowledge of the field of sociology are presented. The origins, forms, and forces of human associations are discussed. Consideration is given the several leading schools of sociological thought. The several theories of organic evolution are discussed. The antiquity of man and basic anthropological data are considered. The racial and ethnic groupings of man are then studied in the light of biological, geographical, and cultural factors. The course is designed to meet the needs of the student who desires only an elementary survey of the subject, as well as the student who plans to take advanced courses in social science.
4 semester hours credit

S 3 *Social Problems* — Attention is given the nature, complex causation, and interrelatedness of social problems in general. Cultural change, with its attendant lags, as well as other social forces and conflicts are studied. While sociological theory is occasionally introduced to clarify the problem at hand, the course is essentially practical in character. Such problems as poverty and unemployment, race antagonisms, population pressures, and the broken home are considered. Emphasis is given those pathological conditions which exist in relations between the individual and the group. Typical subjects presented include mental defectiveness and disease, alcoholism and drug addiction, suicide, delinquency and crime, and pathologies of domestic relations. Optional field trips to various institutions give concreteness to the problems studied.
(*Preparation, S 1-2*) *2 semester hours credit*

S 4 *Social Pathology* — Similar to the course in Social Problems in background and approach, this study deals with the maladjustments and ills of human society. Emphasis is given those pathological conditions which exist in relations between the individual and the group. Typical subjects presented include mental defectiveness and disease, alcoholism and drug addiction, suicide, delinquency and crime, and pathologies of domestic relations. The field trips arranged for this course add to the practical knowledge of the social ills which are studied.
(*Preparation, S 1-2*) *2 semester hours credit*

S 5 *Group Dynamics and Leadership* — This course will present an understanding of the intra-personal relationships of people working together in group settings — the family, business, civic, and social. It will review the latest findings in the field of human relations outlining how the individual and the group behave and are influenced in their behavior. The objective of the course is the development of group leadership skills through an insight into group decision procedures and those things that motivate and direct the actions of individuals working together.

2 semester hours credit

S 9 *Cultural Anthropology* — Early types of man and their ways of life; the races of man today and their distribution, capacities, and their cultures; uniformities, differences, transmission and diffusion of cultures; the uses and functions of culture; some contemporary primitive peoples and what we can learn from them concerning ourselves; the relation of anthropology to the other social sciences. *2 semester hours credit*

S 11 *Fundamentals of Social Sciences* — An investigation into the factors, controls, problems and points of view regulating human conduct. A critical analysis of the social sciences, including anthropology, psychology, sociology, ethnology, history, government and politics, jurisprudence, etc., discussing their origins, terminologies, formations, etc., and weaving this basic data into an understanding of their interrelationships. *2 semester hours credit*

S 13-14 *Juvenile Delinquency* — The study of the extent, causation, and prevention of juvenile delinquency. A review of the development of the Juvenile Court and the Youth Authority programs as well as an analysis of probation, parole, and institutional treatment of juvenile delinquents. Evaluation of various prevention programs and the detailed study of a series of case histories.

4 semester hours credit

S 15-16 *Criminology* — The nature and causes of crime, the criminal as a social problem, judicial agencies and procedures with past and present theories and penological practices. Procedures in adult courts, juvenile courts, and family courts. Prison systems as practiced both in Europe and the United States. Classification. Prison labor. Education within prisons. The theory of punishment as a deterrent. The individualization of treatment. Child guidance clinics. Youth service boards. The Borstal System. Social and cultural factors affecting crime. The place of psychiatry, social work, and religion in criminal treatment. The value and effectiveness of probation, parole, and indenture methods of treatment.

4 semester hours credit

S 17 *Preparation for Marriage* — Critical historical analysis of marriage forms and their origins. Factors involved in love and courtship. Parent-child roles during courtship to husband-wife relationship. Psychologic, medical, and theologic prerequisites to marriage. Examination of marriage laws, legal rights and duties of constituents. Marital values and problems previewed, e.g., recreational, educational, religious, child guidance, divorce, etc.

Course designed to summarize research to date of special importance to Social Science majors and those identified with social service agencies.

2 semester hours credit

S 19 *The Family I — The Primary Social Institution* — The American Family — comparison and contrast with other Occidental and Oriental forms, both ancient and contemporary. Current changes in family life and causes. Genic and psychogenic conditioning, explaining the relationship between family members. Particular emphasis is given to the relation of the family to the social sciences and the promotion of education of young people for family life, marriage and parenthood. Of prime value to social service personnel and social science teachers.

2 semester hours credit

S 20 *The Family II — Problems of* — Causes of family disorganization — the impact of social pathology on family life. Case studies secured from welfare agencies. Reformatories, societies for prevention of cruelty to children, court records, and infirmaries for the mentally deficient. The negative influences affecting family health, e.g., disease, crime, poverty, and their prevention. The responsibilities of parenthood defined. *2 semester hours credit*

S 21-22 *Social Service I* — A survey of welfare agencies. Their origins, functions, and method of operation. Problems of agencies involving health, child care, legislation, population distribution, etc. Emphasis is placed upon voluntary and state agencies and laws applicable to them. *4 semester hours credit*

S 23-24 *Social Service II* — Federal agencies and laws applying to their administration. The role of the Federal Government in national welfare and relief. Problems encountered, medical, economic, political, in agency management. Privileges and rights of a United States citizen under social service laws are reviewed. *4 semester hours credit*

S 25-26 *Ethnology — Race Relations and Cultural Contact* — America, the Melting Pot of the World. A critical study of racial traits and cultural associations. The differences between "race" and "culture" — race the biological concept, culture a universal maturing process. The problems of races and nationalities. Race conflicts and exploitation. An examination of the strong contemporary doctrines of racialism. A survey of the premises in which racial and cultural misunderstandings take root. An analysis of race differentials and culture differences. An attempt to reach scientific conclusions pertaining to the causes of biological variations and race attitudes. *4 semester hours credit*

S 27-28 *American Culture* — A study of modern American culture and its major social institutions: economic, religious, governmental, familial, educational, welfare, and recreational. Consideration is also given to social classes and stratification, mobility, and individualism. The parts played by subcultures and cultural integration are also examined. *4 semester hours credit*

S 30-31 *Social Theory* — An historical development of sociological thought from its beginning to the more modern theories. The origins, aims, and accomplishments of the social science movement are studied. Contributions of men since the early nineteenth century are later examined, including Spencer, Marx, Sumner, Ward, Gumplowicz, Durkheim, Pareto and Thomas. *4 semester hours credit*

S 32 *Urban Society* — A study of the modern American city based on its historical background and comparison with other cities of the world. Its types, social values, and pathological elements are discussed as are methods of city planning. *2 semester hours credit*

†IR 7 *Industrial Sociology* — The social, psychological, and biological factors are interacting forces affecting the behavior of workers. This course in the sociology of work relations attempts to study the worker in terms of his needs, desires and ambitions but also considers him as one of a group in the larger area of group dynamics. It discusses the many significant social adjustments made by the individual throughout his work-life; the sociological aspects of worker selection and placement upon industrial morale and teamwork; the formal organization of management and the unions; the strategy and tactics of union-management bargaining; occupational mobility and security; industry and society. *2½ semester hours credit*

†IR 11-12 *Human Relations* — Effective handling of human problems has become a factor of vital importance to management. This course in human relations in business is the foundation to all personnel policy and offers an approach or understanding of value not only to those in personnel work but also to all persons having supervisory relationships. Subjects included for discussion are the techniques of approach to situation analysis; problems in selection; training; employee rating; change of employee status; supervision; wage policies; complaints and grievances; employee morale; labor turnover; discipline; health; safety; employee participation; collective bargaining; public relations. *5 semester hours credit*

IR 22 *Labor-Management Relations* — This course provides a basic treatment of labor economics, including the history of the labor movement and of industrial relations, with emphasis on the present period; theory of collective bargaining; effects of collective bargaining upon income of labor, employment, accumulation of capital, and national income. Policies and practices of labor and management in respect to hiring and layoffs, technological changes, wages and market position, closed and open shop, union-management co-operation, government regulation of labor relations, etc. The problem of strikes and lockouts. Public policy as to industrial relations. *2½ semester hours credit*

Science (Sc)

Sc 1-2 *Survey of the Physical Sciences* — The purpose of the course is to give a definite conception of the physical world to those students who ordinarily would not elect a science course but who need to know something about the contributions and the place of the physical sciences in contemporary civilization. This course begins with a study of the universe and solar system. Consideration is given to the principles of distance, mass and weight, and the simple dynamics of bodies. The earth is studied from the viewpoint of its geological, meteorological, and chemical aspects, these main fields introducing a non-mathematical discussion of magnetism, heat, and electricity. *4 semester hours credit*

Sc 3-4 *Survey of the Physical Sciences* — In this course the phenomena of light are taken up. Following this, consideration is given to spectroscopy and matter structure, the periodic table, acids, bases, salts, and organic compounds. The course concludes with a discussion of certain aspects of physics which are of practical importance in the household, such as heating, lighting, refrigeration, and electrical appliances. *4 semester hours credit*

Sc 5-6 *General Biology* — An elementary study of the common invertebrate animal groups, emphasizing their basic structural characteristics; the properties of protoplasm; cell division; physiological division of labor; methods of reproduction, including binary fission, sporulation, sexual and metagenesis; selected life histories, economic importance, classification and distribution of common representatives. The laboratory work emphasizes the classification and underlying principles of morphology and physiology of the common invertebrates.

4 semester hours credit

Sc 7-8 *General Biology* — Advanced discussions of the vertebrate groups, including the physiology and structural characteristics of the reproductive, digestive, circulatory, respiratory, excretory, nervous, muscle and skeletal systems; the consideration of osmotic diffusion; the transportation and utilization of foodstuffs; the functions and elementary histological characteristics of the main varieties of tissues; classification; distribution and ecological relationships; and an elementary exposition of heredity. The laboratory exercises supplement the theoretical studies of morphology and physiology by dissections on the frog and demonstrations of fundamental physiological concepts.

4 semester hours credit

Sc 9-10 *General Chemistry* — This course will instruct in the fundamental ideas of matter and energy; properties of gases, liquids, and solids; molecular weights; theory of valence; classification of the elements; ionic reactions, chemistry of metals and non-metals; electrochemistry; the solution of all types of problems to illustrate practical applications; introduction to organic chemistry, including industrial applications to petroleum, rubber, synthetic resins, plastics; chemotherapy; laboratory experiments demonstrating the principles discussed in class.   *5 semester hours credit*

Sc 11 *Physics I* — This course covers the principles of mechanics. Some of the topics covered are force; energy; work; statics; elasticity; linear, rotational and harmonic motion; liquids and gases.

Each lecture includes a demonstration period and a problem period in which the student learns the practical application of the physical laws being studied.

2½ semester hours credit

Sc 12 *Physics II* — This course begins with the study of wave motion and sound, and is followed by heat, light, and electricity.

The section in heat includes thermometry, expansion, calorimetry, behavior of gases, vaporization and transfer of heat. Under the subject of light are reflection, refraction, dispersion, diffraction and interference, lenses and optical instruments. The study of electricity includes magnetism, electrostatics, resistance, capacitance, inductance, alternating currents, and series and parallel circuits.

The same lecture procedure is followed with respect to demonstrations and problems as is done in Sc 11.

(*Prerequisite, Sc 11*)   *2½ semester hours credit*

Secretarial (Ss)

Many women find that their employment in either business or professional careers is greatly advantaged by the possession of skills in shorthand and typewriting. Credits in these two fields may be earned and applied toward the degree requirements up to a maximum of ten (10) semester hours upon approval of the Dean. However, no advanced standing credit for courses completed elsewhere will be granted.

†Ss 1 *Shorthand I* — Basic techniques of Gregg system with special emphasis on drills in the use of brief forms and abbreviations; spelling, punctuation, and letter practice, including a large vocabulary of business terms. Transcription is introduced early in this course and rapid writing stressed through practice dictation material. *2½ semester hours credit*

†Ss 2 *Shorthand II* — Continuation of more advanced and difficult letters than those in beginning course, which will include dictation relating to specific fields in business and industry; constant checkups on transcription speed; broader vocabulary development.
(*Prerequisite, Ss 1 or equivalent*) *2½ semester hours credit*

†Ss 3 *Typewriting I* — Mechanical operations of the typewriter; mastering the keyboard; development of correct typewriting technique; proper stroking, rhythm, centering, tabulating; special finger and word exercises; speed tests and hints for developing both speed and accuracy in typewriting. As the semester progresses, elementary transcription will be introduced.
2½ semester hours credit

†Ss 4 *Typewriting II* — A continuation of Ss 3, with emphasis on developing typewriting speed; familiarization with carboning, stenciling, including mimeograph, hectograph, and multilith processes; advanced tabulation, rough draft and copy work; letter writing, and direct machine dictation, including audograph and ediphone. Each student is required to complete an outside typewritten project.
(*Prerequisite, Ss 3 or its equivalent*) *2½ semester hours credit*

Index

NORTHEASTERN UNIVERSITY
COLLEGE OF LIBERAL ARTS

Evening Courses

360 Huntington Avenue, Boston 15, Mass.

Application
Received by ....
Date ....

A fee of five dollars must accompany this application. Make checks, money orders, or drafts payable to Northeastern University. **This fee is not refundable.**

APPLICATION FOR ADMISSION

Date ....19......

To the Director:

    Mr.
    Mrs.
I (Print name in full) Miss ....
                 (First)   (Middle)   (Last)

hereby apply for admission to the College of Liberal Arts, Evening Division.

I plan to take the program checked below, and wish to enter with the term beginning ....195...
                                                month

Bachelor of Arts Degree
  ☐ Economics
  ☐ History-Government
  ☐ Sociology

Associate in Arts Degree
  ☐ Arts
  ☐ Social Sciences

Bachelor of Business Administration
  ☐ Personnel and Industrial Administration
  ☐ Prelegal
  ☐ Public Administration

Certificate
  ☐ Family Institute
  ☐ Institute of Nations

To enable you to determine my eligibility for admission I am furnishing the following information:

Home
Address: Street .... City .... Residence Telephone ....

Employed by:
Company .... Address .... City ....

Date of birth .... Age .... years .... mos ....

Name and address of parent or guardian if under 21 years of age ....

....

FILL OUT IN PENCIL

I have attended the following schools above the eighth grade. (Include other schools of the Northeastern University System and if you have attended other universities designate the school.)

| NAME OF SCHOOL | LOCATION — CITY, STATE | Check Years Attended | | | | Year Left | Year of Graduation | Degree if any |
		1	2	3	4			

Course taken in high school (college, general, etc.) . . . .

I request advanced standing credit and will furnish transcript for previous college work completed at. . . . .

. . . .

For information relative to my character and general ability, I refer you to the following person who is not a student or relative:

Name. . . . . .Street. . . . .

City .State. . . . . .Occupation . . . .

I first learned of Northeastern University through. . . . .

Following is the name and address of the person who recommended that I enter the University . . . .

. . . .

. . . .
Usual signature

Approved for admission as a special student with. . . . . . .units credited.
                               regular

. . . . .Date. . . . .
Director

FILL OUT IN PENCIL

NORTHEASTERN UNIVERSITY
(*COEDUCATIONAL*)

Programs of instruction leading to appropriate degrees are offered by the Schools and Colleges of the University in the following areas of study:

LIBERAL ARTS

The **COLLEGE OF LIBERAL ARTS** offers a broad program of courses in the sciences, mathematics, modern languages, humanities, and social studies serving as a foundation for the understanding of modern culture, social relations, and technical achievement. Varied opportunities are available for specializing. Degrees: Bachelor of Arts; Bachelor of Science.

The **EVENING DIVISION** of the College offers courses in the fields of arts and social sciences during evening and Saturday morning hours. Degrees: Bachelor of Arts; Associate in Arts.

EDUCATION

The **COLLEGE OF EDUCATION** offers day curricula combining broad general education and professional study for the preparation of elementary and secondary school teachers. Degree: Bachelor of Science in Education.

The **GRADUATE DIVISION** of the College offers, during late afternoon, evening, and Saturday morning hours, advanced courses leading to the degree of Master of Education.

BUSINESS

The **COLLEGE OF BUSINESS ADMINISTRATION** offers curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management. Each curriculum represents in itself a broad survey of business technique, differing from the others chiefly in emphasis. Degree: Bachelor of Science in Business Administration.

The **SCHOOL OF BUSINESS,** organize dspecifically to meet through evening classes the needs of employed persons, offers curricula in Accounting, Business Management, Engineering and Management, Industrial Management, Insurance, Marketing, Law and Business, Personnel and Industrial Relations, Real Estate, Retailing, Public Administration, Transportation and Traffic Management. Degrees: Bachelor of Business Administration; Associate in Business Administration.

The **GRADUATE DIVISION** of the School provides an evening program of advanced study leading to the degree of Master of Business Administration.

ENGINEERING

The **COLLEGE OF ENGINEERING** offers professional curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. Degree: Bachelor of Science in Engineering with specification as to field.

The **GRADUATE DIVISION** of the College offers, during evening hours, advanced courses in certain fields of Civil, Mechanical, and Electrical Engineering, Chemistry, and Mathematics-Physics, leading to the degree of Master of Science.

The **LINCOLN INSTITUTE** offers four-year evening programs in the technology of various fields of engineering and in chemistry. The curricula comprise courses of college grade which are integrated into programs covering the several specialized fields. Degrees: Associate in Engineering; Associate in Chemistry.

The Co-operative Plan

The College of Liberal Arts, Education, Business Administration, and Engineering offer day programs and are conducted on the Co-operative Plan. After the freshman year students alternate periods of study with periods of work in the employ of business or industrial concerns. Under this plan they gain valuable experience and earn a large part of their college expenses.

For further information regarding any of the above schools, address

Director of Admissions

NORTHEASTERN UNIVERSITY
BOSTON, MASSACHUSETTS

COpley 7-6600   360 HUNTINGTON AVENUE

NORTHEASTERN UNIVERSITY

LVX
VERITAS
VIRTVS

BULLETIN
1954-1955

Lincoln Institute

EVENING SESSIONS

BOSTON 15, MASSACHUSETTS

OFFICE HOURS

INTERVIEWS

Prospective students, or those desiring advice or guidance regarding any part of the school work or curricula, are encouraged to arrange for personal interviews with the Dean or other officers of instruction. Career planning through competent guidance provides an understanding of professional requirements and develops that definiteness of purpose so vital to success.

NORTHEASTERN UNIVERSITY

EVENING DIVISION

Lincoln Institute

BULLETIN
1954-1955

Evening Engineering Courses
of College Grade

BOSTON 15, MASSACHUSETTS

GIFTS AND BEQUESTS

Northeastern University will welcome gifts and bequests for the following purposes:

(*a*) For its building program.

(*b*) For general endowment.

(*c*) For specific purposes which may especially appeal to the donor.

It is suggested that, when possible, those contemplating gifts or bequests confer with the President of the University regarding the University's needs before legal papers are drawn.

The legal name of the University is "Northeastern University." However, in the making of gifts and bequests to Northeastern, the following wording is suggested: "Northeastern University, an educational institution incorporated under the laws of Massachusetts and located in Boston, Massachusetts."

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1955

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NORTHEASTERN UNIVERSITY

ADMINISTRATIVE ORGANIZATION

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NORTHEASTERN UNIVERSITY

GENERAL UNIVERSITY COMMITTEES

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William Crombie White, *Vice-Chairman*

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Carl Stephens Ell, *Chairman*

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LINCOLN INSTITUTE

ADMINISTRATIVE ORGANIZATION

General Officers of Administration

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FRANK PALMER SPEARE, M.H., LL.D., *President Emeritus of the University*

WILLIAM CROMBIE WHITE, S.B., Ed.M., Eng.D., *Vice-President of the University*

ALBERT ELLSWORTH EVERETT, S.B., M.B.A., *Director of the Evening Division*

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ALBERT ELLSWORTH EVERETT, S.B., M.B.A., *Director of Evening Division*

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MILTON JOHN SCHLAGENHAUF, A.B., B.D., M.A., *Director of Public Relations*

JOHN E. SULLIVAN, A.B., Ed.M., *Placement Officer*

DANIEL JOSEPH ROBERTS, S.B., M.B.A., Ed.M.,
Director of Veterans' and Students' Accounts

PAUL R. SPINNEY, *Director of Veterans' Services*

J. KENNETH STEVENSON, B.C.S., *Supervisor of Buildings and Grounds*

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DAISY MILNE EVERETT, *Bursar*

OFFICE STAFF

ANNE M. MINNAHAN
Administrative Secretary

KATHERINE A. CROWLEY
Secretary

MARY T. DEVINE
Secretary-Recorder

ANNA M. TERRIS
Typist

FACULTY

The Strength of any educational institution lies in the quality of its faculty. This is especially true in a technical institute devoted to the training of mature men and women most of whom are already employed in their chosen professions.

The instructional staff of the Lincoln Institute is composed of men who have an active interest in the welfare of ambitious evening school students. They are men of culture and high ideals and are well qualified by training and experience to teach in their respective fields.

Charles M. Anderson   *Appointed 1949*
B.C.E. Northeastern University, 1930; LL.B. Suffolk University, 1942; Deputy Engineer, Land Court.
Surveying

Robert B. Angus, Jr.   *Appointed 1948*
B.S. Northeastern University, 1947; M.S. Harvard University, 1953; Research Engineer, Air Force Cambridge Research Center.
Direct and Alternating-Current Theory

Kenneth N. Astill   *Appointed 1949*
B.S. University of Rhode Island, 1944; M.A.E. Chrysler Institute of Engineering, 1946; M.S. Harvard University, 1953; Assistant Professor, Tufts College.
Heat Engineeering

Hollis Baird   *Appointed 1945*
Instructor in Physics, Northeastern University; Consulting Engineer, Radio and Television.
Industrial Electronics, Radio Receivers and Transmitters, Frequency Modulation, Television
Chairman of the Department of Electronic Engineering

G. Warren Bates   *Appointed 1949*
B.S. Massachusetts Institute of Technology, 1926; M.A. Boston University, 1938; Instructor, Medford High School.
Sub-Freshman Mathematics, Engineering Mathematics

Ralph S. Blanchard, Jr.   *Appointed 1950*
B.S. University of New Hampshire, 1950; Instructor, Mechanical Engineering Department, Northeastern University.
Mechanical Engineering Laboratory

Harold H. Bloomfield, Jr.   *Appointed 1953*
B.S.M.E. Cornell University, 1945; Engineer, New England Power Service Company.
Hydraulics

Edward Bobroff   *Appointed 1946*
B.M.E. Polytechnic Institute of Brooklyn, New York, 1940; Electrical Engineer, Boston Navy Yard; Registered Professional Engineer.
Advanced Mathematics

Fletcher S. Boig   *Appointed 1945*
B.S. Tufts College, 1932; M.S. Massachusetts Institute of Technology, 1933; Ed.M. Tufts College, 1937; Assistant Professor in Chemistry, Northeastern University.
Chemistry
Chairman of the Department of Chemistry

MYRON L. BOVARNICK   *Appointed 1952*
  B.S. in E.E. Northeastern University, 1949; M.S. University of New Hampshire,
  1953; Research Associate, Electronics Research Project, Northeastern University.
  Electrical Machinery

JEFFREY J. BOWE   *Appointed 1952*
  A.B. Boston College, 1947; A.M. Brown University, 1949; Physicist, Cambridge Re-
  search Laboratory.
  Physics

EARL GEORGE BOYD   *Appointed 1946*
  A.B. University of Maine, 1920; M.A. Boston University, 1935; Head of Mathe-
  matics Department and Director of Mathematics for the City of Chelsea.
  Advanced Mathematics

CURTIS C. BROOKS   *Appointed 1937*
  B.M.E. Northeastern University, 1924; A.M. Boston University, 1937; Instructor in
  Mathematics, Framingham High School.
  Applied Mechanics

GEORGE E. BURDICK   *Appointed 1950*
  A.B. Boston University; Audio Engineer, New England Conservatory of Music; Staff
  Engineer, Hess-Eastern Corp.
  Electronic Laboratory

JAMES A. CAFFREY   *Appointed 1952*
  Ph.B. Boston College, 1922; M.Ed. Boston College, 1926; Instructor in Mathe-
  matics, Boston Latin School.
  Sub-Freshman Mathematics

FRANCIS J. CALLAHAN   *Appointed 1948*
  B.S. Northeastern University, 1948; Manufacturing Engineer, Cambridge Corp.
  Mechanical Engineering Laboratory

MICHAEL A. CANGIANO   *Appointed 1946*
  S.B. Harvard University, 1933; Ed.M. Tufts College, 1949; Head of Physics De-
  partment, Medford High School.
  Engineering Mathematics

WALTER A. CARLSON   *Appointed 1948*
  B.S. in Electrical Engineering, Tufts College, 1941; Application Engineer, Westing-
  house Electric Corporation.
  Direct and Alternating-Current Theory

MARCELLO J. CARRABES   *Appointed 1953*
  B.S. Northeastern University, 1950; M.S. Northeastern University, 1953; Instructor
  in Mathematics, Northeastern University.
  Advanced Mathematics

LAURENCE FULLER CLEVELAND   *Appointed 1931*
  B.S. Worcester Polytechnic Institute, 1929; M.S. Massachusetts Institute of Tech-
  nology, 1935; Associate Professor of Electrical Engineering, Northeastern University.
  Direct and Alternating-Current Machinery
  Chairman of the Department of Electrical Engineering

ROGER T. CONNOR   *Appointed 1953*
  A.B. Boston College, 1952; M.Ed. State Teachers College, Boston, 1953; Instructor
  in Mathematics, Northeastern University.
  Engineering Mathematics

ALBERT L. COYNE   *Appointed 1948*
  B.S. University of Maine, 1915; Ed.M. Harvard University, 1937; Instructor,
  Rindge Technical School.
  Engineering Drawing

OTIS F. CUSHMAN   *Appointed 1937*
  B.S. University of New Hampshire, 1932; M.S. University of New Hampshire, 1934;
  Associate Professor of Drawing, Northeastern University.
  Engineering Drawing

LEO R. DANTONA   *Appointed 1953*
  S.B. Massachusetts Institute of Technology, 1937; Metallurgical Engineer, Vulcan
  Crucible Steel Company
  Engineering Mathematics

WARREN C. DEAN   *Appointed 1941*
  A.B. Boston University, 1931; M.A. Boston University, 1940; Assistant Professor of
  Mathematics, Northeastern University.
  Advanced Mathematics
  Chairman of the Department of Engineering Mathematics

BERNARD W. DEVINE   *Appointed 1950*
  A.M.E. Lincoln Technical Institute, 1949; Superintendent of Power and Distribution,
  American Optical Company, Southbridge.
  Mechanical Engineering Laboratory

J. JAMES DEVINE   *Appointed 1939*
  B.S. University of Rhode Island, 1927; Sc.M. Brown University, 1936; Associate
  Professor of Engineering Drawing, Northeastern University.
  Engineering Drawing

CHARLES PHILIP ENGELHARDT, JR.   *Appointed 1942*
  B.S. Harvard University, 1928; Master of Architecture, Harvard University, 1930;
  Architect, Kilham, Hopkins, Greeley & Brodie.
  Machine Drawing

ARTHUR L. EVANS   *Appointed 1946*
  A.B. Boston College, 1922; M.S. Boston College, 1923; Master in Science Depart-
  ment, Boston English High School.
  Physics

HOWARD W. EVIRS, JR.   *Appointed 1952*
  B.S. Northeastern University, 1951; Consulting Engineer's Assistant, Fitchburg
  Gas and Electric Light Company, Boston.
  D.C.-A.C. Theory

PATRICK H. FERZOCO   *Appointed 1949*
  Lowell Institute, 1926; Instructor of Machine Construction and Tool Design,
  Wentworth Institute.
  Engineering Drawing

WILLIAM D. FINAN   *Appointed 1946*
  A.B. Boston College, 1938; M.A. Columbia University, 1941; Instructor in Mathe-
  matics, Weeks Junior High School, Newton.
  Sub-Freshman Mathematics

JOHN L. FREEDMAN   *Appointed 1949*
  S.B. Massachusetts Institute of Technology, 1932; Engineer, Laboratory for Elec-
  tronics.
  Electron Tube I and II, Electronic Laboratory

MELVIN W. FRIEDMAN   *Appointed 1948*
  S.B. Massachusetts Institute of Technology; Personnel Manager, Webster Lens Co.
  Engineering Drawing

ROYAL MERRILL FRYE   *Appointed 1930*
  A.B. 1911; A.M. 1912; Ph.D. 1934, Boston University; Professor of Physics, Sim-
  mons College; Evening Graduate Division, Northeastern University.
  Physics

SAMUEL M. GIVEEN   *Appointed 1952*
A.B. Bowdoin College, 1942; A.M. Harvard, 1951; Instructor in Mathematics, Northeastern University.
Engineering Mathematics

FRANK A. HAMILTON   *Appointed 1947*
A.C.E. Lincoln Technical Institute, 1939; Structural Engineer, Jackson & Moreland.
Structural Drawing

KEITH HANDSAKER   *Appointed 1953*
B.B.A. Northeastern University, 1951; Research Development Engineer, Massachusetts Institute of Technology.
Electron Laboratory

FRANCIS R. HANKARD   *Appointed 1946*
S.B. Northeastern University, 1946; M.A. Boston University, 1949; Chemist, State Police Laboratories.
Physics

GEORGE W. HANKINSON   *Appointed 1944*
B.A. Mount Allison University, 1937; S.B. Northeastern University, 1943; M.S. Harvard University, 1951; Assistant Professor in Civil Engineering, Northeastern University.
Water Supply, Sewage and Sewage Disposal

EARLE D. HARDY   *Appointed 1947*
A.E. Lincoln Technical Institute, 1946; B.B.A. Engineering and Management, Northeastern University, 1947; Superintendent, Town of Norwood Municipal Light Department.
Strength of Materials

ROBERT L. HARRINGTON   *Appointed 1948*
B.M.E. Clarkson College of Technology, 1939; M.S. Case Institute of Technology, 1941; Assistant Professor of Mechanical Engineering, Tufts College.
Heat Engineering

ERIC HARRISON   *Appointed 1949*
Wentworth Institute, 1920; B.S. Suffolk University, 1937; M.A. Suffolk University, 1951; Instructor in Mechanical Drawing, Medford High School.
Engineering Drawing

JAMES C. HEBARD, JR.   *Appointed 1946*
B.S. Northeastern University, 1943; Senior Mechanical Engineer, Computer Department, Equipment Engineering Division, Raytheon Manufacturing Company.
Machine Design

DAVID E. HIGGINBOTHAM   *Appointed 1947*
S.B. Northeastern University, 1944; S.M. Massachusetts Institute of Technology, 1948; Associate Professor of Electrical Engineering, Tufts College.
Advanced Electrical Laboratory

PERCY H. HILL   *Appointed 1950*
B.M.E. Rensselaer Polytechnic Institute, 1944; M.S. Harvard University, 1951; Assistant Professor in Engineering, Tufts College.
Applied Mathematics, Strength of Materials

ROBERT EDGAR HODGDON   *Appointed 1927*
B.S. University of New Hampshire; M.S. Massachusetts Institute of Technology; Instructor, Rindge Technical School.
Physics

JACQUE A. HOGG   *Appointed 1953*
B.S. Physics, Pennsylvania State University, 1944; Research Engineer, Massachusetts Institute of Technology Instrumentation Laboratory.
Engineering Mathematics

DAVID M. HOWELL   *Appointed 1951*
    B.S. University of California, 1945; M.S. University of Michigan, 1947; Ph.D. University of Michigan, 1952; Assistant Professor of Chemistry, Northeastern University.
    Physical Chemistry

EVERETT L. HUME   *Appointed 1950*
    B.S. 1933, M.S. 1933, Massachusetts Institute of Technology; Engineer, Jackson & Moreland.
    Hydraulics

WARD M. HUNTING   *Appointed 1953*
    B.S. Houghton College, 1947; M.S. University of Massachusetts, 1949; Assistant Professor of Chemistry, Eastern Nazarene College.
    Qualitative Chemistry, Quantitative Chemistry

ARTHUR E. JOHNSON   *Appointed 1947*
    B.S. Carnegie Institute of Technology, 1939; Lincoln Laboratory, Massachusetts Institute of Technology.
    Engineering Drawing

CHRISTOPHER F. KENNEDY   *Appointed 1949*
    A.B. Harvard University, 1944; Ed.M. Boston Teachers College, 1947; Assistant Professor of Mathematics, Northeastern University.
    Advanced Mathematics
    Chairman of Department of Advanced Mathematics

JOHN JOSEPH KLEIN   *Appointed 1949*
    B.S. Northeastern University, 1949; Instructor in Electrical Engineering, Northeastern University.
    Direct and Alternating-Current Machinery Laboratory

RICHARD E. KLOKOW   *Appointed 1953*
    B.E.E. Marquette University, 1949; M.S. University of Pittsburgh, 1952; Instructor, Massachusetts Institute of Technology.
    D.C.-A.C. Theory

HORATIO W. LAMSON   *Appointed 1945*
    B.S. Massachusetts Institute of Technology, 1915; M.A. Harvard University, 1917; Research Engineer, General Radio Company.
    Alternating-Current Theory, Electrical Measurements.

HERBERT C. LANG   *Appointed 1936*
    B.S. Northeastern University, 1934; Chief Draftsman, Mason-Neilan Regulator Company.
    Machine Drawing

JOHN ROBERT LEIGHTON   *Appointed 1915*
    B.C.E. Northeastern University, 1914; Lens Manufacturer, John R. Leighton.
    Applied Mechanics, Strength of Materials
    Chairman of Department of Applied Mechanics and Strength of Materials

DEANE LENT   *Appointed 1949*
    A.B. Dartmouth College, 1930; Assistant Professor, Mechanical Engineering, Massachusetts Institute of Technology.
    Mechanism

EDWARD F. LOBACZ   *Appointed 1951*
    B.S.C.E. Northeastern University, 1943; M.S.C.E. Harvard University, 1948; Soils Engineer, New England Division, Corps of Engineers, U. S. Army, Boston, Mass.
    Structural Analysis

ANDREW G. LOFGREN   *Appointed 1946*
    Lowell Institute, 1932; A.A. Harvard University, 1942; Ed.M. Boston University, 1946; Master, Mechanical Drawing, Boston Technical High School.
    Engineering Drawing

BERTRAM S. LONG *Appointed 1952*
S.B. Northeastern University, 1949; M.S. Northeastern University, 1953; Instructor of Mechanical Engineering, Northeastern University.
Mechanical Engineering Laboratory

ROGER G. LONG *Appointed 1952*
A.E.E. Lincoln Technical Institute, 1950; Graduate Study, Harvard University, 1950-51; B.B.A. Northeastern University, 1953; Development Engineer, General Communication Company.
Advanced Electronic Laboratory

KENNETH A. LUCAS *Appointed 1950*
S.B. Massachusetts Institute of Technology, 1925; M.Ed. Boston University, 1931; Civil Engineer, Whitman & Howard, Inc.
Surveying

ALAN A. MACKEY *Appointed 1952*
B.S. Northeastern University, 1951; A.M. Harvard University, 1954; Instructor in Mathematics, Northeastern University.
Engineering Mathematics

ALVIN MANDELL *Appointed 1950*
B.E.E. College of the City of New York, 1943; P.E. 1952; Graduate Student, North-eastern University; Project Engineer, Ultrasonic Corp.
Electron Tubes and Circuits I and II; Electronic Laboratory

ALFRED G. MARCOTTE *Appointed 1950*
B.S. Tufts College, 1950; Instructor in Electrical Engineering, Northeastern University.
Direct and Alternating-Current Machinery Laboratory

HAROLD K. McAFEE *Appointed 1949*
B.S.C.E. Norwich University, 1943; Engineer, Fay, Spofford & Thorndike.
Strength of Materials

HAROLD T. McALEER *Appointed 1953*
S.B. Massachusetts Institute of Technology, 1953; M.S. Massachusetts Institute of Technology, 1953; Development Engineer, General Radio Company.
Electron Tubes II

FRANCIS T. McCABE *Appointed 1952*
B.S. University of Maine, 1917; Ed.M. Harvard University, 1928; Headmaster, Rindge Technical School.
Engineering Drawing

NORMAN S. McCALLISTER *Appointed 1946*
A.B. Bates College, 1931; Ed.M. Bates College, 1938; Assistant Professor of Mathematics, Northeastern University.
Advanced Mathematics

EDWARD F. McCARREN, JR. *Appointed 1951*
A.E.E. Lincoln Technical Institute, 1951; Electronic Technician, Northeastern University.
Advanced Electronic Laboratory

VERNON S. McFARLIN *Appointed 1953*
B.E.E. Northeastern University, 1931; Supervising Engineer, Boston Edison Company.
Engineering Mathematics

WALDEMAR S. McGUIRE *Appointed 1936*
B.S. Massachusetts Institute of Technology, 1918; A.M. Boston University, 1930; Associate Professor of Chemistry, Northeastern University.
Qualitative and Quantitative Chemistry

GEORGE HARRIS MESERVE, JR.   *Appointed 1929*
   B.C.E. Northeastern University, 1925; B.S. Northeastern University, 1931; Ed.M.
   Boston University, 1940; Professor of History and Art, Northeastern University.
   Engineering Drawing
   Chairman of the Department of Engineering Drawing

CARL MILLER   *Appointed 1947*
   A.B. Harvard University, 1929; LL.B. Boston University, 1933; Ed.M. Boston
   Teachers' College, 1935; Instructor, Boston School Department.
   Engineering Mathematics, Sub-Freshman Mathematics
   Chairman of Department of Sub-Freshman Mathematics

ERNEST E. MILLS   *Appointed 1947*
   B.S. Northeastern University, 1946; Instructor, Mechanical Engineering, North-
   eastern University.
   Mechanical Engineering Laboratory

H. CARLTON MOORE   *Appointed 1948*
   S.B., 1924; S.M., 1933; Sc.D., 1941, Massachusetts Institute of Technology; Senior
   Mechanical Engineer, Metcalf & Eddy.
   Heat Engineering

JAMES M. MORAN   *Appointed 1952*
   B.S. in E.E. Rutgers University, 1940; Executive Vice-President, Barkley & Dexter
   Laboratories, Inc.
   D.C. Theory, Electrical Machinery

JOHN J. NILAND   *Appointed 1950*
   Lowell Institute, 1939; Design Engineer, Stone & Webster Engineering Corp.
   Structural Analysis

LOUIS NOVAK   *Appointed 1952*
   Drawing and Painting Diploma, Massachusetts School of Art, 1926; B.S.E. Massa-
   chusetts School of Art, 1938; Instructor of Engineering Drawing, Wentworth
   Institute; Professional Artist.
   Engineering Drawing

JOHN R. O'BRIEN   *Appointed 1946*
   A.B. Boston College, 1933; A.M. Boston College, 1934; Instructor in Mathematics;
   Junior Master, Boston School Department.
   Engineering Mathematics, Advanced Mathematics

RALPH W. O'ROURKE   *Appointed 1953*
   B.S.E. Fitchburg State Teachers College, 1936; M.S. University of Massachusetts,
   1938; Instructor in Engineering Drawing, Apprentice School, Boston Naval Ship-
   yard.
   Engineering Drawing

ANDREW G. OSTERBERG   *Appointed 1950*
   A.M.E. Lincoln Technical Institute, 1949; Chief Engineer, Tileston & Hollings-
   worth Co.
   Mechanical Engineering Laboratory

THOMAS J. OWENS   *Appointed 1952*
   A.B. Boston College, 1943; Instructor in Mathematics, Quincy High School.
   Sub-Freshman Mathematics

WILLIAM H. PARMENTER   *Appointed 1952*
   A.E. (Electronics) Lincoln Technical Institute, 1948; B.B.A. in E. & M. Northeastern
   University, 1952; Assistant Engineer, Sigma Instruments.
   Electron Laboratory

WILLIAM C. PAXTON   *Appointed 1945*
   B.C.E. Northeastern University, 1930; Director of Public Works, Framingham,
   Mass.
   Transportation Engineering, Hydraulics

EDWIN B. PRAY *Appointed 1950*
Graduate Program, Northeastern University; Department Head, Engineering Test
Laboratory, Sylvania Electric Products, Inc.
Electron Laboratory, Electron Tubes and Circuits I and II

GERALD PUTNAM *Appointed 1947*
S.B. Massachusetts Institute of Technology, 1923; Assistant Professor, Massachusetts
Institute of Technology.
Engineering Mathematics

RICHARD S. RICE *Appointed 1951*
S.B. Thayer School of Civil Engineering, Dartmouth College, 1943; M.S. Massachusetts Institute of Technology, 1947; Structural Engineer, Jackson & Moreland,
Engineers.
Concrete Design

GUSTAV ROOK *Appointed 1941*
B.S. Northeastern University, 1939; Graduate Study, Harvard and Northeastern
Universities; Associate Professor in Drawing, Northeastern University.
Machine Drawing
Chairman of Department of Machine Drawing.

DAVID E. ROSENGARD *Appointed 1946*
A.B. Harvard College, 1931; A.M. Harvard University, 1932; Master, Boston Public
High Schools.
Advanced Mathematics

BARNET RUDMAN *Appointed 1942*
A.B. Harvard University, 1921; Ed.M. Boston Teachers' College, 1934; Instructor,
English High School.
Engineering Mathematics

ALBERT E. SANDERSON *Appointed 1936*
B.C.E. Northeastern University, 1926; B.S. Northeastern University, 1940; M.S.
Harvard University, 1944; Associate Professor of Drawing, Northeastern University.
Structural Design

FRANK W. SARNOW, JR. *Appointed 1948*
B.S. Northeastern University, 1939; Project Engineer, U. S. Corps of Engineers.
Engineering Drawing

CHARLES F. SEAVERNS *Appointed 1941*
Harvard University, 1915–17; Associate in Engineering, Lincoln Technical Institute,
1944; Graduate work in Education, Boston University, 1945–47; Instructor in
Drawing, Northeastern University.
Engineering Drawing

ROBERT A. SHEPARD *Appointed 1951*
B.S. Yale University, 1944; Ph.D. Yale University, 1950; Assistant Professor in
Chemistry, Northeastern University.
Organic Chemistry

ERNEST L. SPENCER *Appointed 1941*
B.S. Northeastern University, 1936; M.S. Harvard University, 1943; Associate Professor of Civil Engineering, Northeastern University.
Concrete Design
Chairman of the Department of Civil Engineering

FREDERICK ARLINGTON STEARNS *Appointed 1921*
B.S. 1917, M.S. 1934, Massachusetts Institute of Technology; Associate Professor of
Mechanical Engineering, Northeastern University.
Heat Engineering
Chairman of the Department of Mechanical Engineering

THOMAS R. TUTTLE, JR. *Appointed 1953*
S.B. Northeastern University, 1953; Research Fellow, Northeastern University.
Quantitative Chemistry Laboratory

JOHN F. TWIGG   *Appointed 1951*
  B.S. U. S. Naval Academy, 1943; M.A. Boston University, 1950; Instructor in
  Engineering Graphics, Massachusetts Institute of Technology.
  Advanced Mathematics

SHERMAN VANNAH   *Appointed 1952*
  B.S. University of Maine, 1938; M.S. Harvard University, 1948; Assistant Professor
  of Mechanical Engineering, Tufts College.
  Mechanical Engineering Laboratory

ARTHUR M. VUILLEUMIER   *Appointed 1953*
  Instructor in Electronics, Massachusetts Trades School; Project Engineer, L. M.
  Herman Company, RCA Sound Division Section.
  Electron Laboratory

RICHARD WADLER   *Appointed 1953*
  A.M.E. Lincoln Technical Institute, 1947; Mechanical Engineer, Raytheon Manu-
  facturing Company.
  Machine Design

THOMAS H. WALLACE   *Appointed 1941*
  S.B. Boston University, 1933; M.A. Harvard Graduate School, 1936; Ph.D. Boston
  University, 1939; Associate Professor of Physics, Northeastern University.
  Physics
  Chairman of the Department of Physics

JOHN E. WALSH   *Appointed 1947*
  A.B. St. Michael's College, 1938; A.M. Boston University, 1940; Research Engineer,
  Air Force Cambridge Research Center.
  Engineering Mathematics

JOHN L. WARNER   *Appointed 1948*
  B.S. Tufts College, 1942; M.S. Harvard University, 1950; Associate Professor of
  Electrical Engineering, Tufts College.
  Transmission Line Theory, Electronics for Industry

GEORGE B. WELCH   *Appointed 1946*
  B.S. Bowdoin College, 1922; Ph.D. Cornell University, 1928; Associate Professor of
  Physics, Northeastern University.
  Electronic Physics

RALPH E. WELLINGS   *Appointed 1944*
  A.B. Boston College, 1920; A.M. Boston College, 1925; Ed.M. Boston Teachers'
  College, 1930; Head of Science Department, Dorchester High School.
  General Chemistry, Physics

ROBERT S. WHITE   *Appointed 1946*
  S.B. Tufts College, 1945; Professor of Mechanical Engineering, Northeastern Uni-
  versity.
  Mechanical Engineering Laboratory

ALBERT E. WHITTAKER   *Appointed 1936*
  B.M.E. Northeastern University, 1924; Ed.M. Harvard University, 1932; B.S. North-
  eastern University, 1933; Associate Professor of Mechanical Engineering, North-
  eastern University.
  Applied Mechanics

ALBERT G. WILSON, JR.   *Appointed 1948*
  B.S. in Civil Engineering, Thayer School, Dartmouth, 1946; M. S. Case Institute of
  Technology, 1948; Structural Engineer, Metcalf and Eddy.
  Applied Mechanics

JOSEPH W. ZELLER   *Appointed 1950*
  B.S. 1908, M.E. 1938, Tufts College; Professor of Mechanical Engineering, North-
  eastern University.
  Machine Design

NORTHEASTERN UNIVERSITY

GENERAL STATEMENT

NORTHEASTERN UNIVERSITY is incorporated as a philanthropic institution under the General Laws of Massachusetts. The State Legislature, by special enactment, has given the University general degree granting powers.

The Corporation of Northeastern University consists of men who occupy responsible positions in business and the professions. This Corporation elects from its membership a Board of Trustees in whom the control of the institution is vested. The Board of Trustees has four standing committees: (a) An Executive Committee which has general supervision of the financial and educational policies of the University; (b) a Committee on Buildings which has general supervision over the building needs of the University; (c) a Committee on Funds and Investments which has the responsibility of administering the funds of the University; (d) a Committee on Development which is concerned with furthering the development plans of the University.

Founded in 1898, Northeastern University from its beginning has had as its dominant purpose the discovery of human and social needs and the meeting of these needs in distinctive and highly serviceable ways. While subscribing to the most progressive educational thought and practice, the University has not duplicated the programs of other institutions but has sought "to bring education more directly into the service of human needs."

The Northeastern Plan of Education is especially designed for students who must earn while they learn. Basically, this plan consists of two types of education:

(1) The Day Colleges are conducted upon the co-operative basis whereby upper-class students alternate regular periods of instruction at the University with similar periods under supervised employment upon a job with pay in business or industry. Approximately six hundred business and industrial concerns co-operate with Northeastern University in making this program effective.

(2) The Evening Division offers curricula for students who hold regular jobs in the day and attend classes in the evening hours.

The following is a brief outline of the principal types of educational opportunities offered:

In the Field of Liberal Arts —

The College of Liberal Arts offers majors in the usual fields of the arts and sciences leading to the degrees of Bachelor of Arts and Bachelor of Science. With the exception of pre-professional programs, all day curricula are five years in length and operated on the Co-operative Plan.

The Evening Division of the College offers courses in the fields of arts and social sciences leading to the Associate in Arts and Bachelor of Arts degrees.

In the Field of Business —

The College of Business Administration offers five-year co-operative curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management leading to the degree of Bachelor of Science in Business Administration.

The School of Business — operated during evening hours — offers undergraduate curricula leading to the degree of Bachelor of Business Administration in Accounting, Business Management, Credit and Financial Management, Industrial Management, Insurance, Law and Business, Marketing, Office Management, Personnel and Industrial Relations, Production Management, Public Administration, Real Estate, Retailing, Traffic and Transportation, and Engineering and Management. Students desiring shorter programs concentrated in specific areas may enroll in one of the Institute programs provided in each of the areas mentioned above. The Institute for Business and Professional Secretaries is also offered as a special program for women.

The Graduate Division of the School of Business provides an evening program of graduate study leading to the degree of Master of Business Administration.

In the Field of Engineering —

The College of Engineering, one of the largest in the United States, offers five-year co-operative curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering leading to the

degree of Bachelor of Science with specification according to the department in which the student qualifies.

The College of Engineering also offers during evening hours graduate programs of instruction leading to the degree of Master of Science in certain fields of Civil, Mechanical, and Electrical Engineering. These evening curricula are designed to be of service to young engineering graduates who are employed in the Greater Boston area.

The Lincoln Institute offers during evening hours college level programs leading to the degree of Associate in Engineering in Chemistry, Civil, Mechanical, Electrical, Electronic, and Industrial Engineering.

In the Field of Education —

The College of Education offers four-year curricula leading to the degree of Bachelor of Science in Education. These are designed particularly to meet the needs of high school graduates who desire to prepare themselves for teaching and administrative positions in elementary and secondary schools.

During late afternoons, evenings, and Saturday mornings, the College of Education also sponsors graduate courses for teachers in service and leading to the degree of Master of Education.

LOCATION OF UNIVERSITY BUILDINGS

Northeastern University is located in Boston, a city which is rich in educational and cultural opportunities. The Lincoln Institute is in the University center on Huntington Avenue just beyond Massachusetts Avenue at the entrance to the Huntington Avenue Subway. The School is easily reached from the various railroad stations and from all points of the Metropolitan Transit Authority.

RICHARDS HALL

Richards Hall, a four-story building at 360 Huntington Avenue, contains over one hundred thousand square feet of floor space devoted to administrative and instructional purposes. On the first floor are the general administrative offices of the University. The University Bookstore, the "Husky Hut" and the student checkroom are located on the ground floor. On the various floors are three large lecture halls and numerous classrooms and laboratories. The offices of the Evening Division are located on the first floor.

STUDENT CENTER BUILDING

The Student Center Building contains administrative offices, facilities for student activities, reading and study rooms, lounges, some classrooms and an auditorium seating 1,300 for student convocations.

LIBRARY BUILDING

This structure, completed in 1952, is a companion building to Richards Hall, consists of five floors, and contains about 85,000 square feet of floor area. The lower two and one-half floors are used for the University Library. It provides five reading rooms seating over 600 students and stack capacity for about 170,000 volumes in addition to the special facilities of a modern university library. A well-equipped listening room, a browsing library, smoking rooms, and a microfilm room are included among these facilities. The upper two and one-half floors house the Department of Drawing and the Departments of English and Modern Languages and a number of classrooms and drawing rooms.

SCIENCE HALL

This building contains forty-two thousand square feet of floor space. Here are located the Chemical Engineering and Biological laboratories, and eighteen classrooms and lecture halls.

BOTOLPH BUILDING

The Botolph Building is devoted largely to work in Electrical and Civil Engineering. Here are located the Sanitary, Concrete, Photogrammetric, Electronics, and Electrical Measurements and Dynamo Laboratories in addition to department offices, classrooms and conference rooms.

BEACON HILL BUILDING

The Beacon Hill Building, now occupied exclusively by the School of Law, is located at 47 Mt. Vernon Street, within sight of the State House, and contains administrative offices, a library, classrooms, student lounges, and other facilities.

GENERAL INFORMATION

STUDENT BODY

THE STUDENTS of the Lincoln Institute represent men and women of earnest purpose and firm endeavor who bring to bear on their work a thoroughness which promises future success. Their ages last year ranged from seventeen to fifty-two, the average age being twenty-six years. Almost all the students are engaged in work during the day and many different occupations have their representatives in the student body, a fact which demonstrates that the School can be of service to men in many walks of life. Some students are preparing to enter engineering work; many are already engaged in engineering work and are studying to prepare themselves for increased responsibility and rewards.

TRANSPORTATION

THE RAILROAD SYSTEMS entering Boston issue students' tickets to students under twenty-one years of age. Veterans regardless of age are eligible for reduced rates on most of the railroads. Applications for these may be obtained at a railroad office and must be presented at the school office for signature.

The Administrative Office will do everything possible to make share-the-ride arrangements among members of the student body to accommodate those who have transportation problems.

LIBRARY AND STUDY AREAS

THE UNIVERSITY LIBRARY is well equipped in technical literature and is available for use of students of the Institute. The reading rooms are open from 9:00 A.M. to 7:30 P.M. on weekdays, and from 9:00 A.M. to 12:00 NOON on Saturdays. The privilege of obtaining books from the Boston Public Library is extended to students of the Institute. Applications for this privilege should be made at the Administrative Office of the Institute where the necessary blanks may be obtained.

Adequate study areas are available in the Library and Student Center Building for student use.

TEXTBOOKS AND SUPPLIES

THE UNIVERSITY BOOKSTORE is operated for the convenience of the student body. All books and supplies which are required by the students for their work in the Institute may be purchased at the Bookstore.

VISITORS

Visitors are always welcome at one class session in any department. Those who wish to visit any of the classes should call at the school office and obtain a visitor's card signed by the Dean.

SCHOLARSHIPS

The Executive Council has made available a few scholarships to assist needy students of good mental capacity who, because of financial limitations, might be deprived of educational opportunities. The award when a scholarship is granted may range up to one-half of the cost of tuition for the year, depending upon the student's need and scholastic achievement.

DEAN'S LIST

A Dean's List, issued at the end of each school year, contains the names of all students who have, while carrying a full program (three subjects), attained a scholastic grade of 85%, or better, in each subject.

AWARDS FOR SCHOLASTIC ACHIEVEMENTS

For the school year 1954-55 the Executive Council has offered the following scholarships. To the highest ranking Sub-Freshman, Division A and B Freshman, Sophomore and Junior who returns for the following school year a one-half scholarship of $105. To the second highest ranking Sub-Freshman, Division A and B Freshman, Sophomore and Junior who returns for the following school year a one-quarter scholarship of $52.50. These scholarships will be awarded only to students pursuing a full program for the Degree of Associate in Engineering.

The winners of these scholarships for the past school year were:

Sub-Freshman	*First*, NELSON SAVOIE
	Second, DONALD C. HAIGH
Freshman	
Division A	*First*, SIMON A. SNIDER
	Second, EDWIN NURCZYNSKI
Division B	*First*, RICHARD A. BROWER
	Second, ROBERT F. ARNESEN
Sophomore	*First*, WALTER T. FANDEL
	Second, HENRY J. McCARRICK
Junior	*First*, WILLIAM F. O'BRIEN
	Second, ROBERT BUCHAN

REQUIREMENTS FOR ADMISSION

REGULAR STUDENTS

Applicants for admission who present evidence of completion of an approved secondary school course, or the equivalent of fifteen units (including one unit in Algebra and one in Plane Geometry), may be admitted as regular students, candidates for the Degree of Associate in Engineering and also eligible to proceed later, if they so desire, to the Degree of Bachelor of Business Administration in Engineering and Management offered by Northeastern University Evening School of Business.

CONDITIONED STUDENTS

Applicants for admission who do not meet the full requirements for admission as regular students may, at the discretion of the Committee on Admission, be admitted as conditioned students provided such secondary school work as has been completed embraces one unit of Algebra and one unit of Plane Geometry.

A conditioned student whose scholarship is satisfactory but who has not removed his conditions within the time specified by the Committee on Admission may be permitted to continue with his program of studies, but on the completion of the chosen four-year curriculum he will receive a diploma indicating the completion of the program, but not carrying the award of the Degree of Associate in Engineering.

SPECIAL STUDENTS

Students who wish to register for a special program or for single courses will be admitted as special students, not candidates for the diploma or Degree, provided their previous education and training permit them to pursue the courses with profit.

Programs are planned to meet individual needs and should prove of benefit to those who wish rapid and immediate knowledge of certain fields, whether to supplement former training or to obtain preparation which will permit them to enter a new line of endeavor.

LATE REGISTRATION

Students should avoid late registrations since no one is permitted to join a class after the second session. *No deduction from tuition fees is made because of late enrollment.*

CLASSIFICATION OF STUDENTS

DIVISION A

Students who enter School at the beginning of the normal school year in September are termed Division A students. Programs for these students are arranged so that the work of the school year is completed by May or in early June by attendance three evenings a week. Students, however, may elect to carry a lighter scholastic load than the regular program. Summer courses are not necessary for Division A students.

DIVISION B

All Freshman courses are available in January and those entering School at that time are termed Division B students. They complete two of the Freshman courses between January and the end of May by attending classes three evenings per week. The third of the required courses is taken during the Summer Term. Division B students may thus complete the first-year requirements and continue in September, 1955, with the Sophomore program of courses.

Summer attendance is not compulsory but, in the event that a student does not pursue a summer course, attendance is necessary over a period of five years to complete graduation requirements.

SUB-FRESHMEN

A course in Elementary Algebra and Plane Geometry (Sub-Freshman Mathematics) is available beginning September 21, and ending December 21, 1954, for those students who have not completed courses in Algebra or Plane Geometry or for those students who wish to review these subjects because of the remoteness of their former study of these subjects. This course meets on Tuesday and Friday evenings from 7 to 10 P.M. On the successful completion of this course, students are eligible to begin their first-year engineering studies with Division B students on January 6, 1955. This program permits students to save a year which would otherwise be lost, since it enables them to graduate in the customary period of four years.

In addition to the above course in Sub-Freshman Mathematics, courses in Elementary Algebra and Plane Geometry are available in January and June.

PRECOLLEGE COURSES

In addition to its regular engineering programs, the Lincoln Institute makes available in September, January, and June precollege courses in the fields of mathematics, English, physics, and chemistry for those who need credits in these courses for admission to day or evening college. A special bulletin will be provided on request.

ADMINISTRATIVE REGULATIONS

APPLICATIONS FOR ADMISSION

Applications for admission should be filed as early as possible in order that the necessary investigations may be made and the status of each student definitely determined before the opening day.

STUDENTS ADMITTED WITH ADVANCED STANDING

Advanced Standing Credit may be granted for work completed in other approved schools, colleges, or institutions provided the courses taken were equivalent to those offered by the Lincoln Institute. It will be necessary for the applicant to obtain an official transcript of record together with a catalogue and present them to the Dean before any action can be taken.

REGISTRATION

Each student is required to present himself at the school office, and to have his course approved by the Dean or his assistants and to complete his registration.

In order that the school officers might be in a position to offer proper guidance, every student is required to take a Mathematics Placement Test. This test will be based on the standard first-year Algebra course as offered in high school. For September students this test will be given on September 14; for January students on December 28.

THE SCHOOL YEAR

The school year is divided into two semesters of seventeen weeks each. The first semester extends from September 20 to January 28, and the second semester from January 31 to May 31. Attention is drawn to the fact that Division B students begin their studies on January 6.

SESSIONS

Classes meet on weekday evenings. There are no classes on Saturdays. A full schedule will include three evenings a week. All classes meet from 7 to 9:30 P.M. except Chemistry Laboratory classes which meet from 6:30 to 9:30 P.M.

ATTENDANCE REQUIREMENTS

A careful record of attendance upon class exercises is kept for each student. Absence from regularly scheduled classes on any subject will seriously affect the standing of the student. It may cause the removal of certain subjects from his schedule and the listing of these as "conditioned subjects." However, if reasonable excuse for absence be presented, the student may be allowed to make up the time lost, and be given credit for the work; but he must complete the work at such time and in such manner as his instructor in the course shall designate. Students who are absent for four consecutive sessions are automatically withdrawn from the class rolls and may not be admitted to class until they have been reinstated by the Dean.

A minimum attendance record of 75 per cent must be maintained in all classes before a student will be admitted to examination.

Students who are unavoidably absent from class may receive the homework assignments by telephoning the school office.

TRANSFERS

Students are not permitted to change from one course to another without first consulting the Dean and receiving a Transfer Order signed by him.

EXAMINATIONS AND QUIZZES

Tests are held throughout the term at the discretion of the instructors. A test which is missed can be made up only upon petition at the school office, either in person or by telephone, and a fee of $1.50 will be charged for each test made up. Petitions must be filed not later than the first Saturday of the month following the absence. Make-up tests will be given on the second Saturday of each month at 1:30 P.M., in a designated room in Richards Hall. Any student who does not take the test in the month following the absence will lose this make-up privilege. Final examinations are required upon the completion of all courses.

GRADING SYSTEM

The following system of grading is used:

        A — 90 to 100 — Excellent
        B — 80 to 89 — Good
        C — 70 to 79 — Fair

D — 60 to 69 — Lowest Passing Grade
F — 50 to 59 — Conditioned Failure
FF — Below 50 — Complete Failure

It is to be noted that no student will be permitted to graduate who does not maintain a "C" average and that students who have not maintained such an average by the end of the Sophomore year will not be permitted to continue in School.

A student receiving "F" as a course grade may take one special examination. If he fails in that, he must repeat the course.

A student marked "FF" must repeat the course.

It is to be noted that a student whose grade is "F" must petition for re-examination. Permission to take a special examination is a privilege, not a right, and is dependent upon the quality of work the student has done throughout the course. The fee for each special examination is $3.

REPORTS OF STANDING

An informal report of the student's standing is issued at the end of the seventeenth week; and the formal report, covering the year's record, is issued at the close of each year.

Grades and reports are mailed to the students and will not be given out at the school office. Under no circumstances will grades be given over the telephone.

In the case of students who are under twenty-one years of age, reports may be sent to parents in the event of unsatisfactory work on the part of the student, non-compliance with administrative regulations, continued absence, and withdrawal. Parents of minors may obtain reports at any time on request.

GRADUATION REQUIREMENTS

Students may register for single subjects or for complete courses provided such registration meets with the approval of the Dean; but to receive the Degree of Associate in Engineering the student must fulfill the following conditions:

a. He must complete all the courses of his particular curriculum, either by attendance at this Institute, or by receiving advanced standing credit for those courses, or the equivalent of those courses, as determined by the Dean.

b. He must pass such final examinations as are required in the courses he has pursued. The various curricula have been arranged so that the courses can be completed in four years. However, an extension of time will be granted to those who wish to take longer to meet the requirements for graduation.

c. Regardless of the advanced standing credit he receives, he must have been in attendance for at least a year preceding the date on which he expects to graduate; that is, he must complete at least one full year's work in the Lincoln Institute.

d. He must achieve a scholastic average of at least 70% in the courses taken in the Institute. Courses for which a student has been awarded Advanced Standing Credit will not be counted in determining a student's scholastic average.

METHODS OF INSTRUCTION

Instruction is given by means of lectures, recitations, laboratory work and practical work in the drawing rooms. Great value is set upon the educational effect of these exercises, which constitute the foundation of each of the courses. Oral and written examinations are held at the discretion of the instructors.

The attention of every student is drawn to the fact that home assignments must be dutifully done and written work submitted as assigned if the student's grade is not to be seriously affected. Wilful disregard of this matter will result in disciplinary action by the Administrative Officers.

SUBJECTS OF INSTRUCTION

On pages 45 to 59 will be found a detailed statement of the scope of the subjects offered in the various courses. The subjects are numbered for convenience of reference in consulting the various curriculum schedules.

Required courses, and those prerequisite thereto, must have been successfully pursued before any advanced course may be taken.

TUITION AND OTHER FEES

MATRICULATION FEE

A matriculation fee of $5.00 must accompany the initial application for admission to the Institute. This fee is not refundable.

TUITION

Tuition fees are based on a charge of $14.00 a semester hour. The student may determine his cost for tuition by consulting the Programs of Instruction shown on pages 28 to 34 where the semester hour credit for each course is indicated.

The tuition fee for a course meeting 2½ hours per week is, therefore, $35.00 per semester or $70.00* a year. Chemistry Laboratories which meet 3 hours per week carry a fee of $42.00 per semester or $84.00* per year. The charge for the Sub-Freshman Mathematics course is $70.00.

Tuition is charged on a semester basis payable at the beginning of each semester. As a convenience, however, and unless otherwise requested, the tuition for each semester is payable in installments as indicated below.

Payment Number	Div. A Students	Sub-Freshman Students	Div. B Students	Summer Students
1st	Sept. 20	Sept. 20	Jan. 6	June 7
2nd	Nov. 15		Mar. 28	July 15
3rd	Jan. 31			
4th	Mar. 28			

LATE PAYMENT FEE

Payments are due by Saturday of the week indicated above. If payment is not made, or a deferred payment agreement arranged, by that date, a late fee of $2.00 is charged.

*DEFERRED PAYMENT PRIVILEGE

Occasionally situations develop—usually beyond the control of the student — which make it difficult to meet the payments in the manner outlined above. Under such circumstances the student is advised to discuss his problem personally with the Student Accounts Office where a convenient deferred payment agreement can be worked out. A service fee of $2.00 is charged for this privilege.

LATE REGISTRATION FEE

Students are urged to register well in advance of the official opening of the semester, since any student who registers after Saturday of the opening week of the School term is charged a Late Registration Fee of $5.00.

CHEMISTRY FEE

All students taking Chemistry are charged a Chemistry laboratory deposit of $15.00, payable in September. Those students taking Organic Chemistry are required to make an additional deposit of $10.00 at the beginning of the second semester.

The unused portion of the deposit will be refunded after deductions are made for breakages, chemicals, supplies and non-returnables.

SPECIAL EXAMINATION FEES

The fee for each special examination for advanced standing, for conditioned students, or for students who have for justifiable cause omitted to take the regular scheduled midyear or final examinations is $3. The fee must be paid before the examination is taken.

The fee for each special test or quiz missed during the month is $1.50 which must be paid before the test is taken.

BOOKS AND SUPPLIES

Students purchase their own textbooks and work materials. The cost varies according to the subject for which the student is enrolled. The average cost for a normal program of three subjects is about $22.00. Textbooks for a single course range from $4.00 to $15.00.

Students taking Engineering Drawing should be prepared to expend a sum of approximately $15.00 for drawing supplies and $22.00 for a set of drawing instruments in addition to the textbooks which cost approximately $9.50.

GRADUATION FEE

On completing the curricular requirements for the Degree of Associate in Engineering the student will pay a graduation fee of $20.00. This fee must be paid by May 15 in the year of the student's graduation.

REFUND OF TUITION

Requests for refunds must be made at the time of filing the application for withdrawal at the school office. If the withdrawal notification is sent in by mail, the refund should be requested in the letter with reasons which necessitate the withdrawal. *No refunds will be granted to a student who voluntarily withdraws* or who has attended more than five weeks of the term for which payment has been made.

Refunds of tuition will be considered only in the following instances:

1. If, because of illness, a student is compelled to withdraw before the fifth week of the term, or
2. If a student who is regularly employed is sent out of town permanently by his employer, or
3. If the hours of employment of a student who is regularly employed are changed so as to make it impossible for him to continue in attendance, or
4. If a student is inducted into military service.

The Committee on Withdrawals will consider requests for tuition refunds only on the following bases:

1. That the application for withdrawal be made immediately after the student ceases attendance;
2. The request for refund is accompanied by an *acceptable* physician's certificate in the instance of illness, or by an *acceptable* employer's certification in the instance of a change in place or hours of employment;
3. Evidence of induction into military service.

For cases complying with the above, partial refunds on tuition for the semester may be allowed according to the following schedule:

Petition for Withdrawal Filed Within: *Refund to Students in*

Petition for Withdrawal Filed Within:	Regular Term	Div. B Term	Summer Term
One week	80%	80%	80%
Two weeks	80%	80%	60%
Three weeks	60%	60%	40%
Four weeks	40%	40%	20%
Five weeks	20%	20%	0%
Six weeks	0%	20%	0%
After six weeks	0%	0%	0%

The above does not include fixed or non-refundable fees or laboratory fees for which there is no refund allowed.

The official "Application for Withdrawal" form may be obtained in the school office. All refunds are made through the Student Accounts Office of the University. The refund procedure in such cases takes from two to three weeks. A check is mailed directly to the student for any refund to which he is entitled.

PROGRAMS OF INSTRUCTION

LEADING TO THE DEGREE OF ASSOCIATE IN ENGINEERING

The Lincoln Institute offers four-year courses in Chemistry, Civil Engineering, Electrical Engineering, Electronic Engineering, Industrial Engineering and Mechanical Engineering. Schedules of the various curricula are given on the following pages.

On the satisfactory completion of a prescribed four-year course the Degree of Associate in Engineering is awarded to all regular students.

All these courses are of strictly college grade. In those cases where students are unable, because of circumstances, to carry all of the work prescribed in any year, an extension of time will be granted by the Dean, who will determine which subjects shall be excluded, and also the order in which the omitted subjects shall later be studied.

When a student elects a curriculum he is expected to complete all the subjects in that curriculum in order to receive the Degree.

Graduation from these programs carries four years' credit towards a six-year program leading to the Degree of B.B.A. in Engineering and Management offered by Northeastern University Evening School of Business.

Northeastern U[...]en by the Architect

The facilities of Northeastern University are housed in the buildings shown above which i[...]versity Library, Science Hall, Student Center Building, Alumni Auditorium, Richards Hall, Gymnasium and Indoor Athletic Field. Not included in the drawing are the [...]ng and the Greenleaf Building, which house classrooms and laboratory facilities.

SPECIAL COURSE IN CHEMISTRY

Leading to a Diploma

FIRST YEAR

First Semester			Second Semester		
Course No.	Course	Class Hours	Course No.	Course	Class Hours
M1	Algebra..............	2½	M2	Trigonometry..........	2½
*P1	Physics I.............	2½	P2	Physics II.............	2½
		5			5

SECOND YEAR

*Ch1	General Chemistry......	2½	Ch2	General Chemistry......	2½
*ChL1	General Chem. Lab.....	3	ChL2	General Chem. Lab.....	3
		5½			5½

THIRD YEAR

Ch3	Qualitative Chemistry...	2½	Ch4	Quantitative Chemistry.	2½
ChL3	Qualitative Chem. Lab...	3	ChL4	Quantitative Chem. Lab.	3
		5½			5½

FOURTH YEAR

*Ch5	Organic Chemistry.....	2½	Ch6	Organic Chemistry......	2½
*ChL5	Organic Chem. Lab.....	3	ChL6	Organic Chem. Lab.....	3
		5½			5½

These courses carry credit towards the Degree of Associate in Engineering and the Degree of B.B.A. in Engineering and Management offered by Northeastern University Evening School of Business.

Students wishing to pursue programs for the Degree should consult the Dean regarding particulars.

* No credit allowed until completion of second semester.

CHEMISTRY

Leading to the Degree of Associate in Engineering

The Science of Chemistry and Chemical Engineering has undergone a marked development in recent years. It has grown out of the discoveries of the chemical laboratories which have launched many new industries whose production processes involve chemical as well as physical change. The chemist is in demand and his aid is sought in the operation of plants producing drugs, oils, rayon and cellophane, plastics and various synthetic products resulting from intensive research during the war. The chemist may assist in the creation of more economical manufacturing processes, promote the development of manufacturing by-products, and be instrumental in the discovery of new products in the research laboratories.

In addition to the fundamental courses in chemistry, mathematics, and physics, a considerable amount of time is devoted to more advanced work in chemistry. Since the field is so varied, the curriculum has been designed to give the students a broad training rather than a specialized training in one specific industry.

FIRST YEAR

	First Semester			Second Semester	
Course No.	Course	Class Hours	Course No.	Course	Class Hours
M1	Algebra................	2½	M2	Trigonometry..........	2½
*P1	Physics I..............	2½	P2	Physics II.............	2½
*D1	Engineering Drawing....	2½	D2	Engineering Drawing....	2½
		7½			7½

SECOND YEAR

	First Semester			Second Semester	
M3	Analytical Geometry ⎱		M6	Integral Calculus.......	2½
M5	Differential Calculus ⎰ ··	2½	Ch2	General Chemistry......	2½
*Ch1	General Chemistry......	2½	ChL2	General Chem. Lab.....	3
*ChL1	General Chem. Lab.....	3			
		8			8

THIRD YEAR

	First Semester			Second Semester	
*ME1	Applied Mechanics I....	2½	ME2	Applied Mechanics II...	2½
Ch3	Qualitative Chemistry .	2½	Ch4	Quantitative Chemistry..	2½
ChL3	Qualitative Analysis Lab.	3	ChL4	Quantitative Analysis Lab.	3
		8			8

FOURTH YEAR

	First Semester			Second Semester	
*Ch7	Physical Chemistry.....	2½	Ch8	Physical Chemistry.....	2½
*Ch5	Organic Chemistry.....	2½	Ch6	Organic Chemistry.....	2½
*ChL5	Organic Chem. Lab.....	3	ChL6	Organic Chem. Lab.....	3
		8			8

* No credit allowed until completion of second semester.

CIVIL ENGINEERING

Leading to the Degree of Associate in Engineering

The field of Civil Engineering has to do with the planning and building of all kinds of structures and public works. Today its major branches include topographical, municipal, railroad, highway, structural, hydraulic, and sanitary engineering. It covers land surveying, the building of railroads, soil mechanics, harbors, docks, the construction of sewers, water works, streets and highways, the design and construction of flood control projects, bridges, buildings, walls, foundations, and all fixed structures.

This curriculum is designed to offer the relatively compact body of principles upon which all work in Civil Engineering depends. It is intended to prepare the young civil engineer to take up the work of design and construction of structures, to solve the problems of water supply, and to undertake intelligently the supervision of work in allied fields of engineering and general contracting.

FIRST YEAR

First Semester			Second Semester		
Course No.	Course	Class Hours	Course No.	Course	Class Hours
M1	Algebra..............	$2\frac{1}{2}$	M2	Trigonometry..........	$2\frac{1}{2}$
*D1	Engineering Drawing....	$2\frac{1}{2}$	D2	Engineering Drawing....	$2\frac{1}{2}$
*P1	Physics I..............	$2\frac{1}{2}$	P2	Physics II.............	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

SECOND YEAR

M3 M5	Analytical Geometry Differential Calculus	$2\frac{1}{2}$	M6	Integral Calculus.......	$2\frac{1}{2}$
			ME2	Applied Mechanics II...	$2\frac{1}{2}$
*ME1	Applied Mechanics I....	$2\frac{1}{2}$	CE2	Surveying II..........	$2\frac{1}{2}$
CE1	Surveying I..........	$2\frac{1}{2}$			
		$7\frac{1}{2}$			$7\frac{1}{2}$

THIRD YEAR

*ME3	Strength of Materials I ..	$2\frac{1}{2}$	ME4	Strength of Materials II.	$2\frac{1}{2}$
CE3	Transportation Engineering.................	$2\frac{1}{2}$	CE4	Hydraulics............	$2\frac{1}{2}$
			CD2	Structural Drawing II...	$2\frac{1}{2}$
*CD1	Structural Drawing I....	$2\frac{1}{2}$			
		$7\frac{1}{2}$			$7\frac{1}{2}$

FOURTH YEAR

*CE5	Structural Analysis I.....	$2\frac{1}{2}$	CE6	Structural Analysis II ...	$2\frac{1}{2}$
*CE7	Concrete Design I	$2\frac{1}{2}$	CE8	Concrete Design II	$2\frac{1}{2}$
†*CE9	Structural Design I	$2\frac{1}{2}$	†CE10	Structural Design II.....	$2\frac{1}{2}$
†CE11	Water Supply.........	$2\frac{1}{2}$	†CE12	Sewage and Sewage Disposal............	$2\frac{1}{2}$
		10			10

* Credit not allowed until completion of second semester.

† Students elect one of these two courses.

ELECTRICAL ENGINEERING

Leading to the Degree of Associate in Engineering

The Electrical Engineering profession affords a wide diversification of employment opportunities. The Electrical industry and the general field of Electrical Engineering are generally divided into two main branches, one having to do with electrical power and the other, electronics and communications. The power group deals principally with larger equipment and apparatus employing heavy currents; the communications group involves more delicate equipment with smaller current values. Electrical Engineering thus includes the generation, transmission and distribution of electrical energy for light and power purposes, the application of d-c and a-c machinery to industry, and the operation of all types of electrical equipment, including telephone, radio and electronic apparatus.

This course of study provides a good theoretical background with practical applications. Instruction is carefully planned and the time is divided among lecture, laboratory testing, homework and reports.

FIRST YEAR

First Semester			Second Semester		
Course No.	Course	Class Hours	Course No.	Course	Class Hours
M1	Algebra..............	$2\frac{1}{2}$	M2	Trigonometry..........	$2\frac{1}{2}$
*D1	Engineering Drawing ...	$2\frac{1}{2}$	D2	Engineering Drawing....	$2\frac{1}{2}$
*P1	Physics I	$2\frac{1}{2}$	P2	Physics II.............	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

SECOND YEAR

M3	Analytical Geometry }	$2\frac{1}{2}$	M6	Integral Calculus.......	$2\frac{1}{2}$
M5	Differential Calculus } ··		EE2	A–C Theory...........	$2\frac{1}{2}$
EE1	D–C Theory...........	$2\frac{1}{2}$	ME2	Applied Mechanics II...	$2\frac{1}{2}$
*ME1	Applied Mechanics I....	$2\frac{1}{2}$			
		$7\frac{1}{2}$			$7\frac{1}{2}$

THIRD YEAR

*ME3	Strength of Materials....	$2\frac{1}{2}$	ME4	Strength of Materials....	$2\frac{1}{2}$
EE5	D–C Machinery........	$2\frac{1}{2}$	EE6	A–C Machinery........	$2\frac{1}{2}$
EL1	D–C Machinery Lab....	$2\frac{1}{2}$	EL2	A–C Machinery Lab. I .	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

FOURTH YEAR

EE7	Electronics for Industry..	$2\frac{1}{2}$	EE8	Transmission Theory	$2\frac{1}{2}$
*ME5	Heat Engineering.......	$2\frac{1}{2}$	ME6	Heat Engineering......	$2\frac{1}{2}$
EL3	A-C Machinery Lab. II.	$2\frac{1}{2}$	EL4	Electronics for Industry Lab................	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

*No credit allowed until completion of second semester.

ELECTRONIC ENGINEERING

Leading to the Degree of Associate in Engineering

This course is designed to train students for the various branches of the field of Electronics. The new advancements in the fields of radio, television, radar and sonar created by the urgencies of war have opened up greater opportunities for intellectual pioneering in these fields of engineering than in other branches of the profession.

Since electron tubes and circuits function around the principles of Electricity, this subject is adequately treated in the second year of the course. After a thorough study of the various types of electron tubes and their basic circuits in the third year, the fourth year is devoted to the various important fields that the student may wish to enter, such as Industrial Electronics, Communications, Broadcast Stations, and the new fields of Frequency Modulation and Television.

The whole course is a good balance between theory and practice, and experiments involving electron tubes and their applications are used through the entire last two years of the course. Laboratory reports and homework problems are used to supplement the experiments and lectures so that the student will absorb the material in a thorough manner.

FIRST YEAR

	First Semester			Second Semester	
Course No.	Course	Class Hours	Course No.	Course	Class Hours
M1	Algebra...............	2½	M2	Trigonometry..........	2½
*D1	Engineering Drawing....	2½	D2	Engineering Drawing....	2½
*P1	Physics I..............	2½	P2	Physics II.............	2½
		7½			7½

SECOND YEAR

M3	Analytical Geometry }		M6	Integral Calculus.......	2½
M5	Differential Calculus } ··	2½	EE2	A–C Theory...........	2½
EE1	D–C Theory...........	2½	EE4	Electrical Machinery....	2½
P3	Electronic Physics......	2½			
		7½			7½

THIRD YEAR

**EE11	Electron Tubes and Circuits I...........	5	**EE12	Electron Tubes and Circuits II..........	5
EE9	Electrical Measurements.	2½	EL6	Electronic Lab.........	2½
		7½			7½

FOURTH YEAR

EE13	Radio Receivers........	2½	**EE14	Frequency Modulation and Television.......	5
EE15	Radio Transmitters.....	2½			
EL7	Advanced Electronic Lab. I..............	2½	EL8	Advanced Electronic Lab. II.............	2½
		7½			7½

*No credit allowed until completion of second semester.
**Two nights per week.

INDUSTRIAL ENGINEERING

Leading to the Degree of Associate in Engineering

Meeting the tremendous production requirements of World War II has called for every economy of time in man and machine hours to produce the maximum output. The scientific approach to the problems of industrial management has created an increasing demand for those trained in engineering and in the fundamentals of industrial management to assume administrative responsibility.

The competition of the postwar period will require continued emphasis on this phase of management and provide many opportunities for trained personnel in methods engineering, time study, production planning and control and other phases of industrial relations pertaining to men and machines.

FIRST YEAR

Course No.	First Semester Course	Class Hours	Course No.	Second Semester Course	Class Hours
M1	Algebra...............	2½	M2	Trigonometry..........	2½
*D1	Engineering Drawing....	2½	D2	Engineering Drawing....	2½
*P1	Physics I	2½	P2	Physics II	2½
		7½			7½

SECOND YEAR

Course No.	Course	Class Hours	Course No.	Course	Class Hours
M3	Analytical Geometry }	2½	M6	Integral Calculus.......	2½
M5	Differential Calculus }		ME2	Applied Mechanics.....	2½
*ME1	Applied Mechanics.....	2½	IE2	Work Simplification	2½
IE1	Job Evaluation and Merit Rating..............	2½			
		7½			7½

THIRD YEAR

Course No.	Course	Class Hours	Course No.	Course	Class Hours
*ME3	Strength of Materials....	2½	ME4	Strength of Materials....	2½
*MD1	Machine Drawing......	2½	MD2	Machine Drawing......	2½
IE3	Time Study..........	2½	IE4	Principles of Production Planning...........	2½
		7½			7½

FOURTH YEAR

Course No.	Course	Class Hours	Course No.	Course	Class Hours
*ME9	Machine Design........	2½	ME10	Machine Design........	2½
*ME5	Heat Engineering.......	2½	ME6	Heat Engineering.......	2½
* *	Engineering Elective....	2½		Engineering Elective....	2½
		7½			7½

*No credit allowed until completion of second semester.

**The electives available are Concrete Design, DC-AC Theory, General Chemistry Lecture, Hydraulics, Mechanism, Structural Analysis, Structural Drawing, and Surveying.

MECHANICAL ENGINEERING

Leading to the Degree of Associate in Engineering

The field of mechanical engineering is concerned with the harnessing of our power resources by means of machinery to perform useful work. In contrast to the civil engineer who deals primarily with static forces, the mechanical engineer is more concerned with the mechanics of motion or kinetics. And because moving parts require constant care and adjustment, the mechanical engineer has the task not only of designing and installing complicated machinery, but also of operating it efficiently after it has been installed.

Among the major branches of mechanical engineering are included power, production engineering, machine and machine-tool design, railway mechanical engineering, automotive engineering, aeronautical engineering, refrigerating engineering, air conditioning engineering, and the numerous mechanical problems related to modern industrial operation.

This program of study is designed to give the student considerable training in the principles of mechanical engineering and equip him for advancement in the many subdivisions of this branch of engineering.

FIRST YEAR

	First Semester			Second Semester	
Course No.	Course	Class Hours	Course No.	Course	Class Hours
M1	Algebra................	$2\frac{1}{2}$	M2	Trigonometry..........	$2\frac{1}{2}$
*D1	Engineering Drawing....	$2\frac{1}{2}$	D2	Engineering Drawing....	$2\frac{1}{2}$
*P1	Physics I..............	$2\frac{1}{2}$	P2	Physics II.............	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

SECOND YEAR

M3	Analytical Geometry }	$2\frac{1}{2}$	M6	Integral Calculus.......	$2\frac{1}{2}$
M5	Differential Calculus }		MD2	Machine Drawing......	$2\frac{1}{2}$
*MD1	Machine Drawing......	$2\frac{1}{2}$	ME2	Applied Mechanics.....	$2\frac{1}{2}$
*ME1	Applied Mechanics.....	$2\frac{1}{2}$			
		$7\frac{1}{2}$			$7\frac{1}{2}$

THIRD YEAR

*ME3	Strength of Materials....	$2\frac{1}{2}$	ME4	Strength of Materials....	$2\frac{1}{2}$
ME7	Mechanism............	$2\frac{1}{2}$	CE4	Hydraulics............	$2\frac{1}{2}$
*ME5	Heat Engineering.......	$2\frac{1}{2}$	ME6	Heat Engineering.......	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

FOURTH YEAR

*ME9	Machine Design	$2\frac{1}{2}$	ME10	Machine Design........	$2\frac{1}{2}$
*ME11	Mechanical Engineering		ME12	Mechanical Engineering	
	Laboratory..........	$2\frac{1}{2}$		Laboratory..........	$2\frac{1}{2}$
**	Engineering Elective....	$2\frac{1}{2}$		Engineering Elective....	$2\frac{1}{2}$
		$7\frac{1}{2}$			$7\frac{1}{2}$

*No credit allowed until completion of second semester.

**The electives available are Concrete Design, DC-AC Theory, General Chemistry Lecture, Structural Analysis, Structural Drawing, Surveying.

PROGRAM LEADING TO DEGREE OF BACHELOR OF BUSINESS ADMINISTRATION IN ENGINEERING AND MANAGEMENT

THE LINCOLN INSTITUTE in conjunction with the Evening School of Business, Northeastern University, offers a six-year program leading to the degree of Bachelor of Business Administration in Engineering and Management. Upon completion of the engineering requirements of sixty semester hours and receipt of the Associate Degree, the candidate will complete in management courses a total of thirty semester hours plus *Business Readings. It is possible to arrange a plan whereby the two programs may be taken concurrently.

Degree Program

	Semester Hours
Lincoln Technical Institute:	
The equivalent of twelve approved full courses in engineering comprising any of the curricula listed on pages 37 to 42.	60
School of Business:	
Courses required of all degree candidates:	
Business Economics	5
Managerial Accounting (Industrial Accounting for students pursuing Production Option)	5
Business Law I, II, III	7½
Elective courses chosen from one of the Options outlined below	12½
Total	30
*Business Readings	5
**Occupational Experience	30
Total Semester Hours Required for Degree	125

Options

TECHNICAL SALES

†Principles Selling	2½
†Sales Management	2½
†Market Research	2½
†Marketing	5
Principles Advertising	2½
Economic Geography	2½
Foreign Trade	5
Business English	5

ADMINISTRATIVE

Office Organization	2½
Credits	2½
Purchasing	2½
†Personnel Administration	5
Government Controls	2½
†Business English	5
Management Small Business	2½

PRODUCTION

†Work Simplification I	2½
†Time Study I	2½
†Job Analysis	2½
†Principles of Production Planning	2½
†Production Control	2½
Quality Control	2½
Materials Handling	2½
Plant Layout	2½
Manufacturing Processes	5
Production Estimating	5

PRE-GRADUATE PROGRAM

†Marketing	5
†Labor-Management Relations	2½
†Principles of Production Planning	2½
†Financial Organization	5
†Statistics	2½

*The Business Readings is not a classroom course, but is designed to broaden the student's acquaintance with selected readings in the field of business management. Courses of equal semester hours credit (five semester hours) may be substituted for Business Readings.

**Occupational Experience is awarded to a maximum of ten semester hours for each of the last three years. The award is based on the nature and quality of the student's occupation during this period.

†Recommended Electives.

ALPHABETICAL LIST OF SUBJECTS IN ALL CURRICULA

(All classes are held 7:00 to 9:30 P.M. unless otherwise stated)

Course No.	Subject	Semester Given	Day
EL7	Advanced Electronic Laboratory I.....	1	Wednesday
EL8	Advanced Electronic Laboratory II....	2	Wednesday
M1	Algebra..........................	1, B, S	Monday
EE6	Alternating-Current Machinery.......	2	Wednesday
EL2	Alternating-Current Machinery Laboratory I...........................	2	Thursday
EL3	Alternating-Current Machinery Laboratory II...........................	1	Monday
EE2	Alternating-Current Theory..........	2	Wednesday
*M3	Analytical Geometry.................	1	Monday
ME1	Applied Mechanics I................	1	Friday
ME2	Applied Mechanics II...............	2	Friday
CE7	Concrete Design I..................	1	Thursday
CE8	Concrete Design II.................	2	Thursday
*M5	Differential Calculus................	1	Monday
EE5	Direct-Current Machinery...........	1	Wednesday
EL1	Direct-Current Machinery Laboratory..	1	Thursday
EE1	Direct-Current Theory..............	1	Wednesday
EE4	Electrical Machinery...............	2	Friday
EE9	Electrical Measurements............	1	Wednesday
EE11	Electron Tubes and Circuits I........	1	Monday and Friday
EE12	Electron Tubes and Circuits II.......	2	Monday and Friday
EL6	Electronic Laboratory..............	2	Wednesday
P3	Electronic Physics.................	1	Friday
EE7	Electronics for Industry.............	1	Friday
EL4	Electronics for Industry Laboratory....	2	Monday
D1	Engineering Drawing I..............	1, B, S	Wednesday
D2	Engineering Drawing II.............	2, 3, S	Wednesday
EE14	Frequency Modulation and Television..	2	Monday and Friday
Ch1	General Chemistry I................	1	Wednesday
Ch2	General Chemistry II	2	Wednesday
ChL1	General Chemistry Laboratory I......	1	Friday (6.30–9.30)
ChL2	General Chemistry Laboratory II......	2	Friday (6.30–9.30)
ME5	Heat Engineering I.................	1	Wednesday
ME6	Heat Engineering II................	2	Wednesday
CE4	Hydraulics.......................	2	Monday or Thursday
M6	Integral Calculus..................	2	Monday
IE1	Job Analysis and Evaluation.........	1	Wednesday (7–9)
ME9	Machine Design I..................	1	Monday or Thursday
ME10	Machine Design II.................	2	Monday or Thursday
MD1	Machine Drawing I................	1	Wednesday
MD2	Machine Drawing II................	2	Wednesday
ME11	Mechanical Engineering Laboratory I..	1	Monday or Thursday
ME12	Mechanical Engineering Laboratory II.	2	Monday or Thursday
ME7	Mechanism.......................	1	Monday or Thursday
Ch5	Organic Chemistry I................	1	Monday
Ch6	Organic Chemistry II...............	2	Monday
ChL5	Organic Chemistry Laboratory I......	1	Friday (6.30–9.30)
ChL6	Organic Chemistry Laboratory II......	2	Friday (6.30–9.30)
Ch7	Physical Chemistry I...............	1	Wednesday
Ch8	Physical Chemistry II..............	2	Wednesday
P1	Physics I.........................	1, S	Friday
P2	Physics II........................	2, S	Friday
IE4	Principles of Production Planning......	2	Thursday (7–9)
Ch3	Qualitative Chemistry..............	1	Wednesday
ChL3	Qualitative Chemistry Laboratory	1	Monday (6.30–9.30)
Ch4	Quantitative Chemistry.............	2	Wednesday

Course No.	Subject	Semester Given	Day
ChL4	Quantitative Chemistry Laboratory....	2	Monday (6.30–9.30)
EE13	Radio Receivers....................	1	Monday
EE15	Radio Transmitters.................	1	Friday
ME3	Strength of Materials I.............	1	Monday
ME4	Strength of Materials II............	2	Monday
CE5	Structural Analysis I...............	1	Friday
CE6	Structural Analysis II..............	2	Friday
CE9	Structural Design I................	1	Tuesday
CE10	Structural Design II...............	2	Tuesday
CD1	Structural Drawing I...............	1	Wednesday
CD2	Structural Drawing II..............	2	Wednesday
CE12	Sewage and Sewage Disposal........	2	Monday
	Sub-Freshman Mathematics.........	1	Tuesday and Friday (7–10)
CE1	Surveying I.......................	1	Thursday
CE2	Surveying II......................	2	Thursday
IE3	Time Study.......................	1	Wednesday or Friday (7–9)
EE8	Transmission and Distribution Theory..	2	Friday
CE3	Transportation Engineering..........	1	Friday
M2	Trigonometry.....................	2, 3, S	Monday
CE11	Water Supply.....................	1	Monday
IE2	Work Simplification................	2	Tuesday or Thursday (7–9)

1 = First Semester; 2 = Second Semester; B = Division B (Jan. 7, 1954); 3 = Repeated for Division B about March 14; S = Summer Term.

* Analytical Geometry and Differential Calculus are given as one course.

ENGINEERING LABORATORY EQUIPMENT

CIVIL ENGINEERING LABORATORIES

A considerable amount of demonstration equipment including many models is available for use in the study of structures, hydraulics, sanitary engineering, highways, concrete and soil mechanics.

Surveying

The Department of Civil Engineering is provided with a variety of excellent and up-to-date equipment for field work. The instruments have been chosen to make possible the working out of advanced as well as elementary field problems, and to acquaint the students with the principal makes and types of instruments in general use.

Hydraulics and Sanitary Engineering

This laboratory, located on the first floor of the Botolph Building, is equipped with demonstration measuring devices for use in connection with the courses in hydraulics.

Complete equipment is also provided for studies of water softening, filtration, coagulation, analysis of water and sewage by the photelometer, and analysis of bacterial condition of water and sewage. Specialized equipment for advanced courses in sanitary research is also available.

Concrete and Highway Engineering

Located on the first floor of the Botolph Building, this modern, temperature-humidity controlled laboratory is equipped for conducting all the routine tests on cement, aggregate and concrete. Considerable equipment is available for conducting research work.

Equipment is also available for conducting a major portion of the accepted tests on bituminous materials and aggregates as used in highway work. Soil Mechanics equipment consists of a general soil sampler, wet-mechanical gram-size analysis, Tri-axial Test equipment, Permeability, OMC unit, CBR equipment and Consolidation unit.

Aerial Photogrammetry

The apparatus in this laboratory may be used to instruct the students in the basic principles of photogrammetry, or may be used

to instruct the students in the more technical phases of photogrammetry such as horizontal control, vertical control, stereoscopic plotting, mechanical triangulation, and the tri-metrogon method of plotting.

CHEMICAL LABORATORIES

For experiments and investigations in Chemistry there are available three laboratories with the following equipment:

Analytical Chemistry

The laboratory for Analytical Chemistry is fully equipped for giving instruction in the usual undergraduate courses. Each student is supplied with the necessary laboratory glassware, porcelain, and the standard pieces of hardware. Special equipment of all needed types is available.

This laboratory is equipped with high pressure steam, vacuum, and the facilities usually found in an analytical laboratory. The various instruments and other chemical equipment necessary for the examination, testing, and analysis of the raw materials, intermediate and final products of the various industries are at hand.

The electrical equipment includes a Kimley electro-analysis machine for the determination of copper, lead, nickel, and zinc; a Hevi-duty electric furnace for use in ignition and combustion work; and a Freas drying oven capable of adjustment for various temperatures. Power is available in a variety of D–C and A–C voltages.

An adjoining balance room is equipped with balances suitable for quantitative analytical work.

Inorganic Chemistry

In the locker assigned to each student for his individual use are the articles needed more or less continually by him as he does his experiments in the laboratory sessions. He has a liberal supply of glass, porcelain, metal and other articles. Additional pieces of apparatus are issued from the stockroom or otherwise made available for use in particular experiments where they are needed.

The laboratories are equipped with general facilities appropriate to this course, such as gas, electricity, cold and hot water, fume hoods.

Organic Chemistry

The needed equipment is available. There are individual lockers and apparatus, fume hoods for general use, and special equipment, as required.

Drying operations are carried out with the aid of a steam-heated drying chamber and electrically heated drying oven. Steam lines on the benches supply the steam for steam distillations, eliminating the necessity of individual steam generators.

ELECTRICAL ENGINEERING LABORATORIES

The Electrical Engineering laboratories are located in the Botolph Building. Four laboratories are included in this unit: Dynamo; Measurements; Industrial Electronics; and Electronics, Communications, and High Frequency.

Dynamo

This laboratory is provided with both 60 cycle three-phase 230 volt alternating current and 115-230 volt three-wire direct current. The equipment includes more than sixty motors and generators of different types together with the necessary auxiliary equipment to operate and test them. The motors and generators have been selected so as to reduce as much as possible the risk from high voltage while making available to the students a representative range of commercial apparatus.

Electrical Measurements

The equipment here is of two distinct types: first, that planned primarily for teaching principles of measurement, and secondly, that which is used in teaching advanced standardizing methods as well as for calibrating instruments in other laboratories of the University. Briefly, this laboratory is equipped for practically any work in electrical measurements except for the absolute determinations carried on in national standardizing laboratories.

Industrial Electronics Laboratory

This laboratory is designed to offer experiments in the application of electronic tubes and circuits to industry. In addition to basic electronic control circuits, there are larger pieces of equipment, including the control of d-c generator voltage, d-c motor speed control, welding control, Thyratron and Ignitron rectifiers, electronic synchronization of a-c sources, and induction heating.

Electronic, Communications, and High-Frequency Laboratory

This laboratory is equipped with apparatus to demonstrate and test the many ramifications of electronic equipment used in low, audio, radio-frequency and higher frequency circuits. Available are many electronic instruments, including vacuum-tube voltmeters, cathode-ray oscilloscopes, audio and radio-frequency oscillators, wave-analyzers, pulse generators and equipment operating at radar frequencies, as well as many other types used in telephone, radio, and television communication circuits.

ELECTRONIC ENGINEERING LABORATORIES

The Electronics laboratories are located in Richards Hall and the Botolph Building.

Electron Tubes and Circuits

Equipment is available to study the operating of all types of electron tubes that are normally used, extending from diodes through to beam tubes, gas triodes, photocells, cathode ray tubes, and the various rectifier, amplifier and other basic circuits used with them, including vacuum tube voltmeters, impedance bridge, regulated power supplies, resistance coupled amplifiers, inverse feedback amplifiers, etc.

Communication Engineering

Equipment available for this course includes crystal oscillators, audio and radio oscillators, radio frequency amplifiers, frequency doublers, plate and grid modulation units, complete transmitters, radio frequency transmission lines, push-pull audio amplifiers, Q-meters, intermodulation meter. The frequency modulation apparatus includes balanced modulators, reactance modulators, phase modulators, discriminators, panoramic adapters, limiters, and networks. The RCA dynamic demonstrator, plus detector, frequency converter, and IF amplifier units are used for receiver experiments.

Apparatus for television includes sweep oscillators and amplifiers, synchronizing circuits, video amplifiers, delay lines, multivibrators, counters, clipping, shaping, and television receiving equipment. A complete rack of television test equipment is available. This includes a sweep generator, marker generator, oscilloscope, master voltohmyst, wave analyzer, etc.

In the newer fields such as Industrial Electronics and Television, equipment is added from time to time as practical experiments are developed.

Industrial Electronics

These laboratories are equipped with modern apparatus for work in the field of industrial electronics. The equipment includes Westinghouse ignitron rectifier, industrial X-ray equipment, motor control unit, induction and di-electric heating, grid controlled rectifiers and welding controls.

INDUSTRIAL ENGINEERING LABORATORY

The Industrial Engineering Laboratory is located in the Greenleaf Building and is devoted exclusively to methods engineering and time study analysis. This laboratory is completely equipped with the latest facilities and tools used by industrial engineers. Besides the general equipment consisting of benches, tables, lathes, jigs, fixtures, and racks, the laboratory has an ample supply of time study boards, stop watches and timers for time study work. There is also available complete motion picture equipment and micro-chronometers for micromotion work.

Students in the Department of Industrial Engineering also share in the use of the Mechanical Engineering Laboratories.

MECHANICAL ENGINEERING LABORATORIES

The Mechanical Engineering Department has a well-equipped laboratory, containing a large variety of modern machines and occupying over 10,000 square feet of floor space in the basement of Richards Hall. Special areas have been set aside and equipped for oil testing, mechanics research, and similar purposes. Auxiliary equipment is, of course, available for making all the usual tests and measurements.

Steam Power

This equipment includes a wide variety of steam engines, turbines, pumps, heat exchangers, and measuring instruments.

Testing Materials and Heat Treatment

For tension, compression, bending, and shearing tests, the laboratory is equipped with a 300,000 lb. capacity Riehle, a 200,000 lb.

and a 50,000 lb. capacity Olsen, as well as several smaller testing machines. For other tests the laboratory has torsional testing machines, impact testers, fatigue testers, hardness testers, extensometers, oil testing equipment, calorimeters, as well as instruments for measuring speed vibration, temperatures, pressures and flow of fluids.

For heat treatment studies, an electric furnace and a gas-fired furnace are available. Equipment magnifying up to 2600 diameters is available for photographing crystalline structures, and the laboratory has polaroid equipment for photoelastic stress analysis.

Machine Shop

Adjoining the laboratory is a machine shop fully equipped with machine tools and welding equipment.

Internal Combustion and Aeronautics

The internal combustion equipment includes a number of gas and oil, automobile, airplane, and Diesel engines. Most of these are set up for running experimental tests, but several are available for dismantling and demonstration purposes.

An open circuit Venturi type wind tunnel having a three-foot throat and capable of 120 miles per hour wind velocity is available for experimental and demonstration work in the measurement of air forces on model planes and other structures. The tunnel is equipped with three component hydraulic balances having variable degrees of sensitivity.

In addition to the above equipment, there is an oil-fired steam boiler, hot-air furnace, unit heater, air conditioning units, centrifugal fan and several weirs for measuring water flow.

Metallography tests with microscopes and photographic apparatus may be performed.

DESIGN AND DRAFTING ROOMS

The School possesses large, light, and well-equipped drawing rooms for the carrying on of the designing and drafting which form so important a part of engineering work. These rooms are supplied with individual drawing tables and stools. Drafting room blackboards are equipped with traveling straightedge devices which facilitate speed and accuracy in blackboard demonstrations.

PHYSICS DEPARTMENT

The Physics lecture room, which is located on the second floor
of Richards Hall, is provided with motion picture facilities, a public
address system, a projection galvanometer, and a demonstration
table equipped with water, compressed air, exhaust and both A.C.
and D.C. electrical outlets.

The equipment which is used for illustrating the fundamental
principles of physics has been carefully selected and adapted espe-
cially for lecture demonstrations. The following is a partial list of
the available apparatus that supplements the usual equipment for
this purpose: Hartl optical disk; eight-foot slide rule; vacuum
pumps; calorimeters; optical benches with associated equipment;
large demonstration cathode-ray oscilloscope; spectroscopes; pro-
jection apparatus; Van de Graaff electrostatic generator; sound and
wave apparatus.

DESCRIPTION OF COURSES

The Lincoln Institute reserves the right to withdraw, modify, or add to the courses offered or to change the order or content of courses in any curriculum.

The Lincoln Institute further reserves the right to change the requirements for graduation, tuition and fees charged, and other regulations. However, no change in tuition and fees at any time shall become effective until the school year following that in which it is announced.

Any changes which may be made from time to time pursuant to the above policy shall be applicable to all students in the school, college, or department concerned, including former students who may re-enroll.

CHEMISTRY

Ch 1-2   General Chemistry

This course will instruct in the fundamental ideas of matter and energy; properties of gases, liquids, and solids; molecular weights; theory of valence; classification of the elements; ionic reactions; chemistry of metals and non-metals; electrochemistry; the solution of all types of problems to illustrate practical applications; introduction to organic chemistry including industrial applications to petroleum, rubber, synthetic resins, plastics; chemotherapy; laboratory experiments demonstrating the principles discussed in class.   *5 semester hours credit*

ChL 1-2   General Chemistry Laboratory

This course consists of a series of laboratory experiments operated in conformance with the lecture course in General Chemistry (Ch 1-2).
                                                          6 semester hours credit

Ch 3   Qualitative Chemistry

The object of this course is not only to give instruction in analytical procedure and technique, but also to give the student a knowledge of the application of the fundamental concepts of solutions to the laboratory work. A portion of the time is devoted to the formulation of numerical terms which are essential to the understanding of the mass action law, ionic equilibria, solubility product, hydrolysis, and redox constants.
(*Prerequisite, Ch 1-2*)   *2½ semester hours credit*

ChL 3   Qualitative Analysis Laboratory

This course applies the material covered in Ch 3 to actual problems. After some preliminary experiments, certain procedures are combined and the separations and identifications made on both known and unknown solutions. Finally, these are combined into a comprehensive system of

analysis which is applied to artificially prepared mixtures and industrial materials. Careful manipulations, thoroughness in observation, and accuracy in arriving at conclusions are expected of each student.

(*Prerequisite, Ch L 1-2*)   *3 semester hours credit*

Ch 4   Quantitative Chemistry

It is the purpose of this course to give to the student a realization of the scientific development of quantitative methods. Each of the major operations such as weighing, measurement of volumes, titration, filtration, ignition, and combustion, is considered from the standpoint of the theoretical principles involved, and with due consideration of the manipulative technique necessary.

This is followed by the combination of these operations and their application to actual analysis, including a comprehensive study of volumetric methods and of the more elementary parts of gravimetric analysis.

As the correct calculation of analytical results is of no less importance than the actual procedures of analysis, a number of problems form a very important part of the course.

(*Prerequisite, Ch 3*)   *2½ semester hours credit*

ChL 4   Quantitative Analysis Laboratory

This is a laboratory course intended to illustrate by actual use the various analytical methods considered in Ch 4. After certain preliminary experiments designed to acquaint the student with the apparatus used, volumetric analysis, including acidimetry and alkalimetry, oxidation, reduction, and precipitation methods are taken up. This is followed by simple gravimetric analyses.

(*Prerequisite, Ch L 3*)   *3 semester hours credit*

Ch 5-6   Organic Chemistry

This course presents the general principles of structure, nomenclature, preparation, uses, and reactions of the most important types of carbon compounds. The topics considered, in order, are: aliphatic, alicyclic, and aromatic hydrocarbons, petroleum and coal products, halogen compounds, alcohols and phenols, ethers, aldehydes and ketones, carboxylic acids and their derivatives, nitrogen compounds, sulfur compounds, polyfunctional compounds, stereoisomerism, amino acids, carbohydrates, dyes, natural and synthetic polymers, and heterocyclic compounds.

(*Prerequisite, Ch 1-2*)   *5 semester hours credit*

ChL 5-6   Organic Chemistry Laboratory

This course is co-ordinated with the lecture course and deals with the preparations and reactions of the aliphatic and aromatic compounds.

6 semester hours credit

Ch 7-8 Physical Chemistry

This course covers the fundamentals of physical chemistry. The topics discussed include the three states of matter, the solution laws, surface

phenomena and colloids, thermochemistry, chemical equilibrium, ionic equilibrium, electrochemical cells and electrolysis, kinetics of chemical reactions, atomic and molecular structure, and radioactivity. Practical applications of these fundamentals are discussed whenever possible.

(Prerequisite, Ch 4, M-6)   *5 semester hours credit*

CIVIL ENGINEERING

CE 1 Surveying I

A course of lectures which treats the basic principles, such as taping, compass, theory and use of the transit as applied to both random and closed traverses, differential leveling, profile leveling, and double-rodded leveling. The D.M.D. and rectangular co-ordinate methods (of computing, plotting and running traverses) are stressed and especially as they may apply to such work or procedure as outlined by the Massachusetts Land Court.

The theory and use of the plane table (including the intersection problem, the resection problem, and three point problem) is also studied.

(Prerequisite, M 1-2)   *2½ semester hours credit*

CE 2 Surveying II

A course of lectures and problems on simple curves (railroad curves and circular arcs), vertical curves, compound curves and Stadia surveying. The method of obtaining cross-sectional areas is taught. The student is instructed in the preparation of earthwork tables and the solution of the Mass diagram.

(Prerequisite, CE 1)   *2½ semester hours credit*

CE 3 Transportation Engineering

This course consists principally of a discussion of modern highway engineering practices. The general features of routing, such as horizontal and vertical curves, rates of grade, superelevation, and traffic control are studied both from the viewpoint of safety and economics. Materials and tests of materials used in the construction of both highway and airport projects are discussed, including drainage problems and frost-action in subgrades. The major portion of the course is spent on the construction procedure of the several types of roadways. These consist of the low-cost types such as stabilized soils, gravel, and crushed stone. The higher-cost types of roadways such as penetrated macadam, Portland Cement concrete, brick pavements, and asphaltic concrete are included. A brief discussion of airport design and layout concludes the course.

The application of the latest research development is considered throughout the entire course.

(Prerequisite, CE 2)   *2½ semester hours credit*

CE 4 Hydraulics

This course is a study of the principles of both hydrostatics and hydrodynamics. The subjects considered are the pressure on submerged areas together with their points of application; the laws governing the flow of fluids through orifices, short tubes, nozzles, weirs, pipe lines, and open channels; Reynolds numbers; and viscosity.

(Prerequisite, ME 1-2)   *2½ semester hours credit*

CE 5-6 Structural Analysis

First term in this theory course covers the equilibrium of forces and structures by analytical and graphical methods. Shear and moment diagrams are reviewed and expanded. Analytical and graphical analysis of roof trusses and mill building frames are worked out. The use of influence lines in analyzing loads on beams, girders, and trusses is discussed as well as absolute maximum moment in beams.

The work in the second term consists of analyzing the stresses in various types of railroad and highway bridge trusses by means of move-up load method and equivalent uniform loadings. Deflections of beams and trusses by method of work (dummy load) and moment-area method are studied. The course closes with an introduction to the slope and deflection method as well as moment distribution method of analyzing statically indeterminate beam and portal problems.

(Prerequisite, ME 3-4)   *5 semester hours credit*

CE 7-8 Concrete Design

A consideration of the theoretical and practical principles involved in the design of concrete and reinforced concrete structures. The following subjects are thoroughly discussed: the manufacture of Portland cement; the specification requirements for fine and coarse aggregates; the design and analysis of reinforced rectangular beams, beams reinforced for compression, and "T" beams using both Tabular design and the Transformed Area methods. The principles involved in web reinforcement for diagonal tension as well as bond and shear stresses are discussed and problems worked out. Consideration is given to the interpretation of the American Concrete Institute Building Code Requirements.

The second part of this course consists of the design and detailing of an interior bay of a building using one-way slabs, T-beams, and continuous girders. Composite beams and the various types of columns with both axial and eccentric heads as well as isolated and combined footings, both on soil and piles, are discussed and design problems worked out. The course concludes with a discussion and the design of retaining walls of the cantilever type.

(Prerequisite, ME 3-4)   *5 semester hours credit*

CE 9-10 Structural Design

This course consists of a study of the design of such structural units as steel beams, girders, columns, trusses, riveted connection and steel frames as a whole. Particular attention is given to the practical phases of construction and their relation to design. The design of structural timber is also studied. In the first half of the year the student is given many problems which he works out at home and in class and the last half of the year is usually devoted to the design and detailing of some larger, more complicated structures or portions of structures such as a plate girder highway bridge.

(Prerequisite, CD 1-2 and ME 3-4)   *5 semester hours credit*

CE 11   Water Supply

A general course in water supply engineering. The following items are studied: Future population forecasting; quality and quantity of water for various uses; rainfall; runoff; ground water and surface water collection and storage; water treatment processes such as slow and rapid sand filter, hardness, iron and other impurities removal; disinfection; and the design of distribution systems.

(Prerequisite, CE 4)   *2½ semester hours credit*

CE 12   Sewage and Sewage Disposal

This course is concerned primarily with the collection and disposal of sewage and storm water. The following specific items are considered: Quantity of sewage and storm water; sewerage systems; collection of data necessary for the design of these systems; and a discussion of the modern methods of sewage treatment and sewage plant operation.

(Prerequisite, CE 4)   *2½ semester hours credit*

CD 1-2   Structural Drawing

The course in Structural Drawing consists of making shop drawings of the various members of modern steel frames. After making drawings of structural sections and standard connections, the student is given data from which he makes framing plans and shop details using both riveted and welded construction. The problems usually covered are portions of a steel frame building, a bridge girder, and a roof truss.

(Prerequisite, D 1-2)   *5 semester hours credit*

ELECTRICAL ENGINEERING

EE 1   Direct-Current Theory

This course is designed to give the student the required understanding of direct-current fundamental circuit theory. It deals with such concepts as electromotive force, current flow, resistance, conductance, circular mil, Ohm's law, series and parallel d-c circuits, d-c power and energy, primary and secondary cells, Kirchoff's laws, Superposition and Thévenin's Theorems, d-c instruments, magnetic and electrostatic circuits.

(Prerequisite, M1-2)   *2½ semester hours credit*

EE 2   Alternating-Current Theory

In this course lectures and problems are presented dealing with fundamental alternating-current circuit theory. Involved are sinusoidal electromotive forces and currents, effective value, power and energy, power factor, complex and polar notations, a-c series and parallel circuits, resonant conditions, and elementary polyphase systems.

(Prerequisite, EE 1)   *2½ semester hours credit*

EE 4   Electrical Machinery

This course is designed to introduce to the electronic student the elements of operation and control of rotating electrical machinery encountered in practice in connection with electronic control devices.

A study will be made of the shunt, series and compound d-c motors and generators with special emphasis placed on their principles of opera-

tion, characteristics, and methods of speed or voltage control. Also involved will be the a-c induction motor, both single-phase and three-phase, as well as elementary alternator theory; together with a consideration of the synchronous motor.

A study of the Amplidyne generator and other special devices used with electronic control circuits will also be made.

(*Prerequisite, EE 1, EE 2*) $2\frac{1}{2}$ *semester hours credit*

EE 5   Direct-Current Machinery

This course involves the principles of operation and testing methods of d-c machinery. It includes the consideration of shunt, series, and compound motors and generators, with emphasis on problems of commutation, armature reaction, losses, efficiencies, stray power, ratings, methods of test as well as auxiliary equipment such as protective devices. The application of d-c machinery to industry is also involved. A review of complex algebra will be given in the latter part of this course.

(*Prerequisite, EE 1*) $2\frac{1}{2}$ *semester hours credit*

EE 6   Alternating-Current Machinery

This course involves the theory of single-phase and polyphase transformers, as well as a-c machinery. Construction and principles of operation of the constant potential, constant current, autotransformer, and other types of transformers are considered with emphasis on the vector diagrams, core losses and methods of test. Attention is also given to the principles of operation of the a-c induction motor, synchronous motor and alternator. The theory of operation, characteristics, load conditions and methods of testing are considered in detail.

(*Prerequisite, EE 2*) $2\frac{1}{2}$ *semester hours credit*

EE 7   Electronics for Industry

This course deals with the basic electron tubes, especially those used in industry for control purposes, as well as electronic control and regulation circuits. A study of the high vacuum diode and triode, Thyratron and photo-tube is made as well as amplifier theory, rectification and filtering, and general industrial control circuit applications.

(*Prerequisites, EE 2 and EE 5*) $2\frac{1}{2}$ *semester hours credit*

EE 8   Transmission and Distribution Theory

This course is concerned with the problems pertaining to the transmission and distribution of a-c energy at power frequencies. Typical transmission line problems are considered, involving normal and abnormal or fault conditions. The method of symmetrical phase components is used in the solution of certain problems. Also considered is protective and station equipment and trends in the power industry.

(*Prerequisite, EE 6*) $2\frac{1}{2}$ *semester hours credit*

EL 1   Direct-Current Machinery Laboratory

This course is designed to apply the information gained from course EE 5. A number of tests are performed on the d-c shunt, series and com-

pound motors as well as tests on the d-c shunt and compound generators. Involved also are experiments on parallel operation of d-c generators, stray power and opposition tests.

(Prerequisite, EE 5)   *2½ semester hours credit*

EL 2   Alternating-Current Machinery Laboratory I

This course offers laboratory work paralleling the lectures of course EE 6 and includes experiments on a-c power circuits, polyphase circuits and power measurements, constant potential transformer tests, constant current transformer, and synchronous machinery.

(Prerequisite, EE 6)   *2½ semester hours credit*

EL 3   Alternating-Current Machinery Laboratory II

This course includes tests on the single-phase and three-phase induction motors, the brush-shifting motor, as well as investigation of induction motor windings, and tests on the Amplidyne generator.

(Prerequisite, EE 6)   *2½ semester hours credit*

EL 4   Electronics for Industry Laboratory

This laboratory course offers an introduction to the subject of the control and regulation of industrial equipment and processes by electronic means. Experiments are performed on the diode, triode, photo-tube and Thyratron as well as the control of motor speed and generator voltage by electronic circuits. Available also are experiments on induction and dielectric heating, Ignitron three-phase rectifier, the Thyratron six-tube rectifier, resistance welding control and automatic synchronization.

(Prerequisite, EE 7)   *2½ semester hours credit*

ELECTRONIC ENGINEERING

EE 9   Electrical Measurements

The successful use of modern electronic equipment in the research or development laboratory and in many operational fields requires a knowledge of the equipment and techniques employed in making precise electrical measurements. This course is intended to give the student a thorough understanding of the modern equipment and procedures used in making accurate D-C and A-C measurements of voltage, current, power, resistance, capacitance, inductance, impedance, frequency, tube characteristics, etc. The factors limiting the precision of the results are analyzed. This lecture course provides a sound basis for future laboratory work.

(Prerequisite, M 6, EE 1-2)   *2½ semester hours credit*

EE 11   Electron Tubes and Circuits I

This course begins with a review of electron theory, then the theory of electron emission, by thermionic, photo-electric, secondary and field means, including the study of the construction and processing of the various types of cathodes. The construction and evacuation of tubes will be discussed. Then the diode tube with the space charge phenomena will be taken up, leading into the control of electrons in vacuum tubes. The static and dynamic characteristics of the various tube types will be covered.

Equivalent amplifier circuits will be studied. Rectifier action will be covered and the addition of gas in vacuum tubes and the control of discharges in gas-filled tubes.

Now the analysis of circuits is started. First are rectifier circuits, both single and three phase, including choke and condenser input filters, and electronically regulated power supplies. Then the study of photocells, cathode ray tubes, multi-purpose and special tubes, followed by the vacuum tube as a control device.

(Prerequisite, EE 1-2)   *5 semester hours credit*

EE 12   Electron Tubes and Circuits II

This course starts with audio frequency amplifiers, first studying the voltage type and later power amplifiers. Included are the following topics: Distortion; Decibels; Input admittance; Resistance and Transformer coupling; D–C amplifiers; Photo-tube amplifiers; Current amplifiers; Volume control methods; Sources of noise; Maximum power output; Plate efficiency; Push-pull amplifiers; Classes A, AB, and B operation; and Feedback amplifiers.

The second half of the course is devoted to Radio frequency amplifiers of both voltage and power type. Included are Class B and C operation and their design; Neutralization; and Frequency multiplication.

(Prerequisite, EE 11)   *5 semester hours credit*

EE 13   Radio Receivers

This course is designed to give the student a thorough knowledge of radio receiver operation and practice. After briefly covering the early types of radio receivers, such as the regenerative and radio frequency circuits, the super-heterodyne will be covered, both for broadcast and communications use. Particular attention will be paid to antenna circuits, pre-selectors, mixers and converters, intermediate frequency amplifiers, and automatic volume control. FM receivers will be started from an over-all viewpoint. Attention will be given to problems of selectivity, sensitivity, stability and fidelity of receivers.

(Prerequisite, EE 12)   *2½ semester hours credit*

EE 14   Frequency Modulation and Television

Fundamental theory of frequency modulation will be covered first, then the various methods of obtaining it in the transmitter and the special circuits found in the receiver. Ultra-high-frequency transmission characteristics will also be covered in this course.

The basic principles of various methods of picture transmission such as wire photo, radio photo, facsimile and then television. Review of the mechanical methods used in early television. Electronic television systems, using the iconoscope and image orthicon for transmission, and cathode ray tube for reception. Synchronizing circuits and problems. Video amplifiers, deflecting circuits, television transmitters, receivers and antennas. Problems and technique of transmission of motion pictures and outdoor and studio scenes.

(Prerequisite, EE 13, 15)   *5 semester hours credit*

EE 15   Radio Transmitters

This course opens with neutralization circuits and then the study of oscillators, including the various feedback circuits, crystal oscillators, parasitic oscillations, and special oscillator circuits. This is followed by a study of modulators, and then complete radio transmitters. The theory is completed with the study of antennas and transmission lines.

(*Prerequisite, EE 12*)   *2½ semester hours credit*

EL 6   Electronic Laboratory

The experiments in this course cover most of the subjects that have been covered by lecture in Electron Tubes and Circuits I and II. They include electron emission, gas diodes, triodes, filter circuits, iron core reactors, Thyratrons, half and full wave rectifiers, voltage regulated power supplies, grid controlled rectifiers, voltage amplifiers, resistance coupled cascade amplifiers, feed-back amplifiers, photo cells and their applications, cathode ray tubes and oscilloscopes. The use of impedance bridges and vacuum tube voltmeters is included in this course.

Laboratory reports are required on each experiment and the class is broken up into small groups so that each student has an adequate chance to participate in the experiment.

(*Must be taken concurrently with EE 12*)   *2½ semester hours credit*

EL 7   Advanced Electronic Laboratory I

The experiments in this course cover the theory subjects studied in the Radio Receiver and Transmitter courses and advanced audio subjects from Electron Tubes and Circuits II. They include phase inverters, push-pull audio amplifiers, transformer coupled audio amplifiers, intermediate frequency amplifiers, frequency mixers, detectors, distortion in audio amplifiers, testing and alignment of complete receivers, frequency multi-pliers, crystal oscillators, power oscillators, audio oscillators, Class C RF amplifiers, amplitude modulated r-f amplifiers, balanced modulators, RF Transmission Lines.

(*Must be taken concurrently with EE 13, 15*)   *2½ semester hours credit*

EL 8   Advanced Electronics Laboratory II

The experiments in this course cover the theory subjects studied in the Frequency Modulation and Television courses. They include Discrimina-tors, Ratio Detectors, Limiters, Reactance Modulators, Phase Modu-lators, Networks in FM circuits, Video Amplifiers, Television pulse generators and deflection circuits, frequency dividing circuits, such as counters and multivibrators. A complete television receiver is also studied for alignment, waveforms and trouble shooting.

(*Must be taken concurrently with EE 14*)   *2½ semester hours credit*

INDUSTRIAL ENGINEERING

IE 1   Job Analysis and Evaluation

Basic principles underlying theory of wage calculation, job elements and their definitions, rating scales, writing job descriptions and specifications, selection of appropriate rating plan, setting up job factors and maximum point values, use of several methods of determining specific point values. Development of wage structures.   *2½ semester hours credit*

IE 2   Work Simplification

The course is designed to present the fundamental principles underlying motion analysis and work simplification. Included in the subjects considered are the following: Process and operation analysis through the use of process charts, flow diagrams, operation charts, man-and-machine charts, micromotion study, principles of motion economy. Work place layout, labor-saving tools and equipment, laboratory development work. Practical applications of work simplification with particular emphasis upon cost analysis.   *2½ semester hours credit*

IE 3   Time Study

Based upon the best established methods procedures, the fundamental principles of time study are considered as a basis for setting production standards. Subjects included in the course are the following: Introduction to wage incentives and current wage plans. History and development of time study, relation to motion and micromotion study, preliminary observation, technique of making time studies. Rating procedure, development of proper concept of "normal" performance, applying the rating and relaxation factors. Setting job and element standards, use of allowances, treatment of variables, introduction to standard data, synthetic standards, problems in the application of standards. Laboratory practice will supplement the classroom work.   *2½ semester hours credit*

IE 4   Principles of Production Planning

A basic treatment of the planning principles applied to the development and operation of a manufacturing unit, including analysis of the product to be manufactured; market and sales research; plant location; plant design and determination of required physical facilities; the internal organization; the engineering organization for development of product; distribution and control of engineering information; establishment of manufacturing budgets for control; production planning, including inventory control policy, receiving and storeskeeping, procurement; plant layout; and managerial controls to appraise manufacturing performance.   *2½ semester hours credit*

MECHANICAL ENGINEERING

ME 1-2   Applied Mechanics

(*a*) The subjects treated are collinear, parallel, concurrent, and non-concurrent force systems in a plane and in space; the determination of the resultant of such systems by both algebraic and graphical means, the forces required to produce equilibrium in such systems; stresses in frames.

(*b*) A continuation of Applied Mechanics (*a*) in which the subjects treated are problems involving static friction, such as the inclined plane and the wedge; first moments as applied to the determination of centers of gravity of areas and solids; second moments and the application to the determination of moments of inertia of plane and solid figures, radius of gyration, polar moment of inertia; product of inertia. Brief consideration is given to kinematics of a particle and kinetics of rigid bodies in rectilinear translation.

(*Prerequisite, M 2 and P 1*)   *5 semester hours credit*

ME 3-4 Strength of Materials

This course comprises the study of the stresses and strains in bodies subjected to tension, compression, and shearing; common theory of beams with thorough description of the distribution of stresses, shearing forces, and bending moments; deflection of beams.

A study is made of the strength of shafting and springs; combined stresses in beams subjected to tension, compression, and bending; also strength of riveted and welded joints, columns, and thin hollow cylinders, and brief consideration of strains and the relation of the stresses on different planes in a body.

(Prerequisite, ME 1-2 and M 6)   *5 semester hours credit*

ME 5-6 Heat Engineering

The fundamentals of thermodynamics are discussed in this course and include the general theory of heat and matter; first and second laws of thermodynamics; equations of state; fundamental equations of thermodynamics; laws of perfect gases; properties of vapors including use of tables and charts; and the general equation for the flow of fluids. Particular emphasis is given to the properties of steam, the use of the steam tables, and the Mollier diagram.

The course also embraces a study of fuels and combustion of fuels as applied to steam boilers.

The purpose of the course is to familiarize the student with the theory of heat as applied to prime movers.

Descriptions of many different kinds of apparatus used in the steam power plant such as engines, turbines, and auxiliary equipment, including pumps, condensers, heaters, fans, etc., comprise the major part of the course. A large number of problems related to the apparatus discussed are solved. In addition to the above, such items as draft, chimneys, coal and ash handling equipment, piping and valves, and power plants are studied. In addition to the study of steam apparatus, air compressors and internal combustion engines are discussed.

(Prerequisite, P 1-2)   *5 semester hours credit*

ME 7 Mechanism (I)

The object of this course is to acquaint the student with the principles of mechanism which are met in practice and in machine design. The topics considered are pulley and gear train calculations, both simple and epicyclic, cam design, conjugate curves, pure rolling contact, theoretical design of gear-tooth shapes, and limitations in involute gearing. The velocity and acceleration analysis of basic linkages are studied in detail.

(Prerequisite, MD 1-2)   *2½ semester hours credit*

ME 9-10 Machine Design

The design aspect of "Materials and Their Properties," "Stress Analysis," "Fastenings," "Power Transmission Equipment — Belts, Chains, Gears, Clutches, Brakes, etc.," "Shafting Design," Bearings, Springs, Cams, Welding, Riveting, is presented for discussion in class and the solution of problems outside of class.

(Prerequisite, ME 3-4)   *5 semester hours credit*

ME 11-12 Mechanical Engineering Laboratory

This course includes a series of experiments upon various kinds of equipment used in modern power plants to demonstrate under actual conditions the principles developed in the Heat Engineering course. Additional experiments which include calibration of instruments, performance of hydraulic equipment, steam equipment as used in power plants, heating units for the household, air conditioning apparatus, internal combustion engines, and testing materials are performed. A report of each experiment is made.

(*Prerequisite, MF 5-6*)   *5 semester hours credit*

DRAWING

D 1-2 Engineering Drawing

This course is planned to meet the requirements of a class composed of students who have had no previous instruction in drafting, and also for those who may have had one or two years' work in preparatory schools.

Instruction is given in the testing, use and care of the instruments and drawing supplies, and solutions are required for problems which are presented on about thirty drawing sheets. The topics studied in these sheets include technique practice, lettering, geometric construction, orthographic projections, auxiliary views, development of objects, isometric, cavalier and cabinet drawing, intersections, sections, helix and application, screw threads, dimensions and inking. A number of practical problems, pertaining to the professional courses to be taken, in which drawing is the application, are also given.

These give the student a thorough training in the fundamental principles of Engineering Drawing, so that he may easily do the drafting required in his professional course. A short lecture is given at the opening of each class based on the work at hand, and individual instruction is given during the remainder of the class period.   *5 semester hours credit*

MD 1-2 Machine Drawing

This course is conducted on a lecture-laboratory basis with the student working out problems under supervision. The fundamental principles of representing the shape and of specifying the size of such machine elements as castings, forgings, fabricated weldings, gears, cams, etc., are taught. The mediums used are multi-view orthographic projection, auxiliary and sectional views, along with the appropriate dimensioning techniques. Lectures and reading assignments are correlated with the classroom problems and cover such topics as the drawing techniques applicable to the particular study, American Standard drafting-room practices, methods and materials of machine production, fractional and decimal dimensioning systems, fasteners, bearings, lubrications, pulleys, piping, clutches, gears, cams, methods of reproduction, etc.

The types of drawings made and analyzed include preliminary machine sketches and assemblies, dimensioned detail working drawings from machine assemblies, assembly drawings from machine details, problems in gear and cam construction.

Drawing examinations covering the principal drawing and dimensioning techniques, and short written quizzes covering the lecture and textbook materials are given periodically throughout the course.
(*Prerequisite, D 1, 2*)   *5 semester hours credit*

MATHEMATICS

Sub-Freshman Mathematics

This course is devoted to a thorough study of Algebra I and Plane Geometry.

M 1   Algebra

Although the primary purpose of this course is to lay a thorough groundwork for the subsequent courses in Analytical Geometry, Calculus, and Applied Mechanics, it is nevertheless a complete unit in itself, and will enable the student to handle a considerable number of the problems arising in engineering practice.

Proceeding from a rapid review of the fundamental operations of Algebra, the work continues with a thorough study of fractions, functions, linear and quadratic equations, equations in quadratic form, graphs, exponents, complex numbers, binomial expansion, variation, and equations of higher degree than the second.
(*Prerequisite, first course in Algebra and Plane Geometry*)
$2\frac{1}{2}$ *semester hours credit*

M 2   Trigonometry

This course includes the solution of all triangles by both natural and logarithmic functions, identities, radian measure, principal values and the solution of trigonometric equations. Particular attention is given to the applications of Trigonometry to engineering practice.
(*Prerequisite, M 1*) $2\frac{1}{2}$ *semester hours credit*

M 3   Analytical Geometry

This course consists of a study of the straight line, circle, and conic sections, using rectangular cartesian co-ordinates only; also the graphs of trigonometric, logarithmic, and exponential equations.
(*Prerequisite, M 1-2*)   *with M 5,* $2\frac{1}{2}$ *semester hours credit*

M 5   Differential Calculus

The work in the course consists of differentiation of algebraic, trigonometric, exponential, and logarithmic functions, both explicit and implicit; slopes of curves; maxima and minima; derivatives of higher order; velocity and acceleration in rectilinear motion.
(*Prerequisite, M 3*)   *with M 3,* $2\frac{1}{2}$ *semester hours credit*

M 6   Integral Calculus

This course deals with integration as the inverse of differentiation as well as the limit of summation. The topics covered are methods of integration; use of integral tables; definite integrals; areas in rectangular co-

ordinates; length of curves; areas of surfaces of revolution; volumes of solids of revolution; multiple definite (iterated) integrals; centroids of plane areas; moment of inertia.

(*Prerequisite, M 5*)   *2½ semester hours credit*

PHYSICS

P 1-2   Physics

This course covers the principle of mechanics. Some of the topics covered are force; energy; work; statics; elasticity; linear, rotational and harmonic motion; liquids and gases.

This is followed by the study of wave motion and sound, and then heat, light, and electricity.

The section in heat includes thermometry, expansion, calorimetry, behavior of gases, vaporization and transfer of heat. Under the subject of light are reflection, refraction, dispersion, diffraction and interference, lenses, and optical instruments. The study of electricity includes magnetism, electrostatics, resistance, capacitance, inductance, alternating currents, and series and parallel circuits.

Each lecture includes a demonstration period and a problem period in which the student learns the practical application of the physical laws being studied.

5 semester hours credit

P 3   Electronic Physics

Designed especially for students taking the Electronic Engineering curriculum, this course deals with the fundamental principles of waves, with particular applications to electromagnetic radiation. Interference, diffraction, and polarization will be treated in detail. A considerable part of the course will be devoted to the study of antennas and the properties of the ionosphere.

(*Prerequisite, P 2*)   *2½ semester hours credit*

NORTHEASTERN UNIVERSITY

THE LINCOLN INSTITUTE

360 Huntington Avenue   **Boston 15, Massachusetts**

To the Dean:

....19........

I ....hereby apply for admission to the
(First name)   (Middle name)   (Last name)

Lincoln Institute in the term beginning in................and submit the following information:
(Sept.—Jan.—June)

....
(Street address)   (Town)   (State)   (Phone)

Age.......... Date of Birth........................Married ☐   Single ☐

Citizen of U. S. Yes ☐   No ☐

Name of your employer........................Nature of your employment.....................

Business address........................Business Telephone.....................

I have attended, including other schools of the Northeastern University system, the following schools above grammar
grade (if attendance at a university, *designate school*):

NAME OF SCHOOL	LOCATION — CITY, STATE	Chk. Yrs. Attended				Date Left	Date of Graduation	Degree if any
		1	2	3	4			

I request advanced standing credit for previous college work completed at (name of institution)................
....I shall furnish transcript.

(OVER)

I wish to enroll for the following:

☐ Curriculum, leading to the Degree of Bachelor of Business Administration in Engineering and Management, offered by the School of Business, Northeastern University, and the Lincoln Institute.

☐ Curriculum leading to the Degree of Associate in Engineering.

☐ Curriculum leading to the Diploma in Chemistry.

☐ I do not wish to pursue a complete curriculum but, as a special student, wish to enroll in the following courses:

. . . .

As part of the program checked above, I wish to elect the following major:

☐ CHEMISTRY   ☐ ELECTRONICS ENGINEERING
☐ CIVIL ENGINEERING   ☐ INDUSTRIAL ENGINEERING
☐ ELECTRICAL ENGINEERING   ☐ MECHANICAL ENGINEERING

☐ I wish to take the Sub-Freshman program with the major checked above.

Please answer the following questions:

Have you passed a course in First Year Algebra? . . . .   If so, give approximate year . . . .

Have you passed a course in Plane Geometry? . . . .   If so, give approximate year . . . .

                                          World War II ☐

Are you to take these courses under the Veterans Administration? . . . . Yes ☐   If Yes   or

                                              No ☐   Korean War ☐

Application Accepted by

                           Signature of Student . . . .

. . . .

            A fee of five dollars must accompany this application.   This fee is not returnable.

NORTHEASTERN UNIVERSITY
COEDUCATIONAL

Programs of instruction leading to appropriate degrees are offered by the Schools and Colleges of the University in the following areas of study.

LIBERAL ARTS

The COLLEGE OF LIBERAL ARTS offers a broad program of courses in the sciences, mathematics, modern languages, humanities, and social studies serving as a foundation for the understanding of modern culture, social relations, and technical achievement. Varied opportunities are available for specialization. Degrees: Bachelor of Arts or Bachelor of Science.

The EVENING DIVISION of the College offers courses in arts and social sciences during evening and Saturday morning hours. Degrees: Bachelor of Arts; Associate in Arts.

EDUCATION

The COLLEGE OF EDUCATION offers day curricula combining broad general education and professional study for the preparation of elementary and secondary school teachers. Degree: Bachelor of Science in Education.

The GRADUATE DIVISION of the College offers, during late afternoon, evening, and Saturday morning hours, advanced courses leading to the degree of Master of Education.

BUSINESS

The COLLEGE OF BUSINESS ADMINISTRATION offers curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management. Each curriculum represents in itself a broad survey of business technique, differing from the others chiefly in emphasis. Degree: Bachelor of Science in Business Administration.

The SCHOOL OF BUSINESS, organized specifically to meet through evening classes the needs of employed persons, offers curricula in Accounting, Business Management, Engineering and Management, Industrial Management, Insurance, Marketing, Law and Business, Personnel and Industrial Relations, Real Estate, Retailing, Public Administration, Transportation and Traffic Management. Degrees: Bachelor of Business Administration; Associate in Business Administration.

THE GRADUATE DIVISION of the School provides an evening program of advanced study leading to the degree of Master of Business Administration.

ENGINEERING

The COLLEGE OF ENGINEERING offers professional curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. Degree: Bachelor of Science in Engineering with specification as to field.

The GRADUATE DIVISION of the College offers, during evening hours, advanced courses in certain fields of Civil, Mechanical, and Electrical Engineering, Chemistry, and Mathematics-Physics, leading to the degree of Master of Science.

THE LINCOLN INSTITUTE offers four-year evening programs in the technology of various fields of engineering and in chemistry. The curricula comprise courses of college grade which are integrated into programs covering the several specialized fields. Degrees: Associate in Engineering; Associate in Chemistry.

The Cooperative Plan

The Colleges of Liberal Arts, Education, Business Administration, and Engineering offer day programs and are conducted on the Co-operative Plan. After the freshman year students alternate periods of study with periods of work in the employ of business or industrial concerns. Under this plan they gain valuable experience and earn a large part of their college expenses.

NORTHEASTERN UNIVERSITY

Graduate Division

COLLEGE OF

ENGINEERING

BULLETIN

1954-1955

EVENING GRADUATE PROGRAMS

BOSTON 15, MASSACHUSETTS

May, 1954

Interview Periods and Regular Sessions

Year	Session	Interview Period	Regular Session
1953-1954	Summer Session	May 17 — May 28	June 7 — Aug. 6
1954-1955	First Semester	Aug. 23 — Sept. 4	Sept. 13 — Jan. 21
	Second Semester	Jan. 10 — Jan. 22	Jan. 31 — May 27
	Summer Session	May 16 — May 27	June 6 — Aug. 5

Office Hours

INTERVIEW PERIODS: Monday through Friday............8:45 a.m.- 8.00 p.m.

Saturdays........................9:00 a.m.-12:00 noon

OTHER TIMES: Monday through Friday............8:45 a.m.- 5:00 p.m.

The office is closed on all legal holidays.

Requests for Bulletins and information about graduate work in the Graduate Division should be addressed to

Dean, Graduate Division
College of Engineering

NORTHEASTERN UNIVERSITY

360 Huntington Avenue, Boston 15, Massachusetts

OFFICE: 140 Richards Hall   COpley 7-6600

NORTHEASTERN UNIVERSITY

Graduate Division

COLLEGE OF

ENGINEERING

—

BULLETIN
1954—1955

EVENING GRADUATE PROGRAMS

Leading to the Degree of Master of Science

BOSTON 15, MASSACHUSETTS
May, 1954

Gifts and Bequests

Northeastern University will welcome gifts and bequests for the following purposes:

(*a*) For its building program.

(*b*) For general endowment.

(*c*) For specific purposes which may especially appeal to the donor.

It is suggested that, when possible, those contemplating gifts or bequests confer with the President of the University regarding the University's needs before legal papers are drawn.

The legal name of the University is "Northeastern University." However, in the making of gifts and bequests to Northeastern the following wording is suggested: "Northeastern University, an educational institution incorporated under the laws of Massachusetts and located in Boston, Massachusetts."

Table of Contents

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Academic Calendar

MAY, 1954 — AUGUST, 1955

The Graduate Division of the College of Engineering of Northeastern University maintains three sessions during the year: the First Semester, beginning in September and ending in January; the Second Semester, beginning in February and ending in May; and the Summer Session of nine weeks, beginning in June and ending in August.

1954

MAY	17	*Monday:* Interview and registration period for 1954 Summer Session begins.
MAY	21	*Friday:* Last day of classes in 1953-1954 Second Semester.
MAY	24	*Monday:* First day of week of final examinations for Second Semester.
MAY	28	*Friday:* 1953-1954 Second Semester ends.
MAY	28	*Friday:* Interview period for 1954 Summer Session ends.
MAY	31	*Monday:* Observance of Memorial Day, University closed.
JUNE	7	*Monday:* 1954 Summer Session begins.
JUNE	8	*Tuesday:* Last day for registration in Summer Session.
JUNE	27	*Sunday:* Commencement.
JULY	5	*Monday:* Observance of Independence Day, University closed.
JULY	30	*Friday:* Last day of classes in Summer Session.
AUGUST	2	*Monday:* First day of week of final examinations for Summer Session.
AUGUST	6	*Friday:* 1954 Summer Session ends.
AUGUST	23	*Monday:* Interview and registration period for 1954-1955 First Semester begins.
SEPTEMBER	4	*Saturday:* Interview period for First Semester ends.
SEPTEMBER	6	*Monday:* Labor Day, University closed.
SEPTEMBER	13	*Monday:* 1954-1955 First Semester begins.
SEPTEMBER	17	*Friday:* Last day for registration in First Semester.
OCTOBER	12	*Tuesday:* Columbus Day, University closed.
NOVEMBER	11	*Thursday:* Armistice Day, University closed.
NOVEMBER	25	*Thursday:* Thanksgiving Day, University closed.
DECEMBER	17	*Friday:* Classes for all students will end at 9:00 p.m. and reconvene on January 3, 1955.

1955

JANUARY	3	*Monday:* Classes resume as usual.
JANUARY	10	*Monday:* Interview and registration period for Second Semester begins.
JANUARY	14	*Friday:* Last day of classes in First Semester.
JANUARY	17	*Monday:* First day of week of final examinations for First Semester.
JANUARY	21	*Friday:* 1954-1955 First Semester ends.
JANUARY	22	*Saturday:* Interview period for Second Semester ends.
JANUARY	31	*Monday:* 1954-1955 Second Semester begins.
FEBRUARY	4	*Friday:* Last day for registration in Second Semester.
FEBRUARY	22	*Tuesday:* Washington's Birthday, University closed.
APRIL	19	*Tuesday:* Patriots' Day, University closed.
MAY	16	*Monday:* Interview and registration period for 1955 Summer Session begins.
MAY	20	*Friday:* Last day of classes in 1954-1955 Second Semester.
MAY	23	*Monday:* First day of week of final examinations for Second Semester.
MAY	27	*Friday:* 1954-1955 Second Semester ends.
MAY	27	*Friday:* Interview period for 1955 Summer Session ends.
MAY	30	*Monday:* Memorial Day, University closed.
JUNE	6	*Monday:* 1955 Summer Session begins.
JUNE	7	*Tuesday:* Last day for registration in Summer Session.
JUNE	17	*Friday:* Commencement.
JULY	4	*Monday:* Independence Day, University closed.
JULY	29	*Friday:* Last day of classes in Summer Session.
AUGUST	1	*Monday:* First day of week of final examinations for Summer Session.
AUGUST	5	*Friday:* 1955 Summer Session ends.

Administrative Organization

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CARL STEPHENS ELL, A.B., M.S., Ed.M., Sc.D., LL.D., L.H.D.	*President of the University*
FRANK PALMER SPEARE, M.H., LL.D.	*President Emeritus of the University*
WILLIAM CROMBIE WHITE, S.B., Ed.M., Eng.D.	*Vice-President of the University*
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MILTON JOHN SCHLAGENHAUF, A.B., B.D., M.A.	*Director of Development*

Graduate Division of the College of Engineering

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Dean of the Graduate Division of the College of Engineering

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Professor of Physics and Chairman of the Department

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ARTHUR ANDREW VERNON, S.B., M.S., Ph.D.
Professor of Chemistry and Chairman of the Department

WILLIAM CROMBIE WHITE, S.B., Ed.M., Eng.D.	*Vice-President of the University*

Administrative Staff of the Graduate Division of the College of Engineering

RUDOLPH MAGNUS MORRIS, *Registrar*	*Office:* 254 Richards Hall
DAISY MILNE EVERETT, *Bursar*	*Office:* 116 Richards Hall
DANIEL J. ROBERTS, JR., *Director of Veterans' and Students' Accounts Office*	
	Office: 249 Richards Hall
PAUL ROCKWELL SPINNEY, *Director of Veterans' Services*	*Office:* 250 Richards Hall
MARY B. FOOR, *Manager of Bookstore*	*Office:* 41 Richards Hall
ROLAND MOODY, *Director of University Libraries*	*Office:* Library
J. KENNETH STEVENSON, *Supervisor of Buildings and Grounds*	*Office:* 156 Richards Hall
JESSIE PAINE RHODES, *Secretary to the Dean of the Graduate Division*	
	Office: 140 Richards Hall
JANET REED CAHILL, *Secretary, Graduate Division*	*Office:* 140 Richards Hall

Teaching Staff

The teaching staff of the Graduate Division is drawn in part from the regular full-time faculty of the College of Engineering of Northeastern University, in part from the faculties of neighboring institutions, and in part from among engineers in practice. Each course is designed to serve a particular purpose and is placed under the leadership of an instructor with special qualifications to handle the subject matter most effectively. The composition of the teaching staff during any particular school year is dependent upon the courses offered during that year. The teaching staff of the Graduate Division during the 1953-1954 school year included the following:

CHARLES O. AHONEN, *Mathematics-Physics*
Associate Professor of Physics, Northeastern University
FRANK R. ARCHIBALD, *Elasticity, Lubrication*
Research Engineer, Arthur D. Little, Incorporated
HAROLD ASQUITH, *Radar Engineering*   Project Engineer, Raytheon Manufacturing Company
EDWARD R. ATKINSON, *Organic Chemistry*
Group Leader, Dewey and Almy Chemical Company
ARRA S. AVAKIAN, *Mathematics*   Staff Engineer, Vectron Incorporated
RICHARD H. BATTIN, *Mathematics*
Research Mathematician, Massachusetts Institute of Technology
IRVING A. BERSTEIN, *Inorganic Chemistry*   Project Leader, Tracerlab, Incorporated
ROBERT L. BLANCHARD, *Electromagnetic Theory*
Vice-President in charge of Engineering, Transonics, Incorporated
RONALD T. BRADSHAW, *Vibration Theory*   Research Engineer, Arthur D. Little, Incorporated
RONALD F. BRODRICK, *Advanced Dynamics*   Project Engineer, Lessells and Associates
HERBERT K. BROWN, *Mathematics*
Professor of Mechanical Engineering, Northeastern University
ALLEN J. BURDOIN, *Applied Fluid Mechanics*   Senior Engineer, Metcalf and Eddy
HAROLD G. CARTER, *Metallography*   Metallurgist, Watertown Arsenal
SZE-HOU CHANG, *Electric Circuit Theory*
Professor of Research in Communications, Northeastern University
JOHN A. CLARK, *Thermodynamics*
Assistant Professor of Mechanical Engineering, Massachusetts Institute of Technology
IRVIN S. COHEN, *Mathematics*
Assistant Professor of Mathematics, Massachusetts Institute of Technology
EDWARD J. CRAIG, *Pulse Circuits*
Assistant Professor of Research in Communications, Northeastern University
LADISLAV DOLANSKY, *Television Circuits*
Assistant Professor of Research in Communications, Northeastern University
MICHAEL M. DUBITZKY, *Heat Transfer*   Research Engineer, Arthur D. Little, Incorporated
PETER ELIAS, *Communication Theory*
Assistant Professor of Electrical Engineering, Massachusetts Institute of Technology
MARTIN W. ESSIGMANN, *Transients*
Professor of Electrical Engineering, Northeastern University
ARTHUR FOSTER, *Refrigeration*
Assistant Professor of Mechanical Engineering, Northeastern University
ANDREW J. FRANK, *Chemistry*   Research Chemist, American Cyanamid Company
VICTOR S. FRANK, *High-Polymer Theory*
Group Leader, Dewey and Almy Chemical Company
ROYAL M. FRYE, *Theoretical Physics*
Professor of Physics and Head of the Department, Simmons College
DAWSON G. FULTON, *Mathematics*   Professor of Mathematics, Tufts College
HERBERT GOODRIDGE, *Protective Relaying*   Senior Engineer, New England Power Service
BERNARD GORDON, *Computers*   Project Engineer, Laboratory for Electronics
WINSTON GOTTSCHALK, *Theoretical Physics*
Research Staff, Raytheon Manufacturing Company

Bruce Hainsworth, *Instrumentation* Supervisor of Quality Control, The Foxboro Company
James Haley, *Soil Mechanics*
Principal Engineer, New England Division, Corps of Engineers
Walter Hauser, *Physics* Assistant Professor of Physics, Boston University
Frank E. Heart, *Computers* Computer Engineer, Massachusets Institute of Technology
Thomas Hewson, *Mechanics of Materials* Chief Engineer, Lessells and Associates
Francis B. Hildebrand, *Mathematics*
Associate Professor of Mathematics, Massachusetts Institute of Technology
J. Anton Hofmann, *Physics* D. I. C. Staff, Massachusetts Institute of Technology
Chaang Huang, *Microwaves* Research Engineer, Sylvania Electric Products Inc.
Clyde W. Hubbard, *Hydraulics*
Hydraulic Engineer, Stone and Webster Engineering Corporation
Emory Ireland, *Structures*
Engineer, Structural Division, Stone and Webster Engineering Corporation
Albert D. Johnson, *Semi-conductor Physics*
Research Physicist, Air Force Cambridge Research Center
David P. Kennedy, *Transistor Engineering*
Senior Engineer, Raytheon Manufacturing Company
M. Frank Knoy, *Power Plant Economics*
Chief Technical Engineer, Boston Consolidated Gas Co.
Walter H. Lob, *Pulse Circuits*
Assistant Professor of Research in Communications, Northeastern University
Edward F. Lobacz, *Soil Mechanics*
Engineer, New England Division, Corps of Engineers
Morton Loewenthal, *Transients* Research Engineer, Massachusetts Institute of Technology
Edward Maskalenko, *Industrial Electronics*
Assistant Professor of Electrical Engineering, Tufts College
Titus E. Mergendahl, *Mathematics* Professor of Mathematics, Tufts College
Felix S. Palubinskas, *Physics* Professor of Engineering, Lowell Technological Institute
Glen F. Pippert, *Mathematics* Ford Foundation Fellow, Harvard University
Robert C. Reid, *Chemical Engineering*
Chemical Engineer, Massachusetts Institute of Technology
J. Spencer Rochefort, *Pulse Circuits*
Associate Professor of Research in Communications, Northeastern University
William Root, *Vector Analysis* Staff Mathematician, Massachusetts Institute of Technology
Lawrence Rosenfeld, *Mathematics*
Research Engineer, Raytheon Manufacturing Company
Barnet L. Rosenthal, *Sanitary Bacteriology*
Chief of Laboratory, Massachusetts Department of Public Health
Shepley L. Ross, *Mathematics*
Assistant Professor of Mathematics, Northeastern University
Richard Rubin, *Transients* Project Engineer, Andrew Alford, Consulting Engineer
Joseph Russell, *Industrial Chemistry*
Instructor in Chemical Engineering, Massachusetts Institute of Technology
Ronald E. Scott, *Transients*
Assistant Professor of Electrical Engineering, Massachusetts Institute of Technology
Victor R. Staknis, *Mathematics*
Assistant Professor of Mathematics, Northeastern University
Harold L. Stubbs, *Mathematics*
Associate Professor of Research in Communications, Northeastern University
Ralph A. Troupe, *Chemical Engineering*
Research Professor of Chemical Engineering, Northeastern University
Kentaro Tsutsumi, *Indeterminate Structures*
Principal Engineer, Jackson and Moreland, Engineers
Rocco Urbano, *Mathematics* Mathematician, Air Force Cambridge Research Center
Perry H. Ware, *High-Voltage Engineering*
Senior Engineer, Simplex Wire and Cable Company
Robert B. Wilcox, *Servomechanisms*
Manager, Servomechanisms Section, Raytheon Manufacturing Company
Stephen Winter, *Physical Chemistry*
Assistant Professor of Chemistry, Northeastern University

General Information

History and Objectives of the Graduate Division

In September, 1948, the College of Engineering of Northeastern University initiated a group of evening courses at the graduate level. The enthusiastic response to these exploratory courses indicated clearly that they met a need in the community that had not been served before.

The substantial enrollment during the 1949-1950 school year encouraged the College of Engineering to establish the Graduate Division and to initiate in September, 1950, evening graduate curricula leading to the degree of Master of Science in certain fields of civil, mechanical, and electrical engineering.

During the period from September, 1950, to the present, the Graduate Division has greatly expanded its course offerings and its degree granting curricula. It is now possible for a regular student in the Graduate Division to pursue a Master of Science degree program in the following fields: Civil Engineering, with a major either in Structures or in Sanitary-Hydraulics; Mechanical Engineering, with a major either in Mechanics or in Heat-Power; Electrical Engineering, with a major either in Electronics-Communication or in Electric-Power; Chemistry; Mathematics-Physics; and Communications.

The program of graduate study at Northeastern University is designed specifically for students who wish to carry on advanced study on a part-time basis while continuing with their regular employment. The courses and curricula of the Graduate Division have been planned to provide the student with a training which emphasizes the fundamentals which are basic to all branches of engineering and science. Accordingly, the courses present particularly the analytical methods used in solving various types of modern technological problems, without, however, neglecting altogether those considerations necessary for practical applications.

Requirements for Admission to the Graduate Division

The evening graduate courses in the Graduate Division are designed for persons who already hold a bachelor's degree from an accredited institution in some field of engineering or science. Persons who do not hold a bachelor's degree, but who are otherwise qualified by reason of their training and experience to profit from the instruction given, will also be permitted to enroll as special students.

Students will be admitted to evening graduate courses only after they have been personally interviewed by the Dean of the Graduate Division, or his representative, who will decide whether the applicant may be enrolled. The purpose of the interview is to determine as far as possible whether the prospective enrollee has the necessary background to handle successfully the work of the course.

Classification of Students in the Graduate Division

All students in the Graduate Division of the College of Engineering are classified in one of three categories:

(1) Special Students — those who do not have a baccalaureate degree from an accredited institution but who are eligible for certain specific courses.

(2) Regular Students — those who have a baccalaureate degree in some field of engineering or science from an accredited institution.

(3) Master's Degree Candidates — those regular students who have successfully completed eight semester hours of graduate work in the Graduate Division of the College of Engineering and whose transcripts of records warrant their being enrolled as candidates for the master's degree.

Requirements for Admission to Candidacy for a Master's Degree

Admission to a course or courses does not constitute acceptance as a candidate for a master's degree.

All students when first accepted by the Dean of the Graduate Division for enrollment in the graduate courses are classified as either special or regular students.

Those regular students who desire to pursue a degree-granting curriculum should present to the Graduate Division at the time of registration a transcript of their records at the institution from which they received the baccalaureate degree and at other institutions where they may have been enrolled. At the time of the interview the Dean will arrange with the student a tentative program of graduate study.

When such a regular student has successfully completed eight semester hours of graduate work at Northeastern, he is then eligible to become a candidate for a master's degree. In order to become a candidate the student must file a formal application therefor and pay a ten-dollar matriculation fee.

The Dean of the Graduate Division and the head or representative of the department in which the student elects his principal studies will evaluate the student's petition for degree candidacy. Upon their recommendation and the approval of the Committee on Engineering Graduate Study, the student will be enrolled as a candidate for the master's degree.

Requirements for the Degree of Master of Science

Upon admission to candidacy for the master's degree in a specified curriculum, an integrated program for the future work to satisfy the degree requirements must be laid out and approved by the head or representative of the department concerned and the Dean of the Graduate Division.

A total of thirty semester hours is required for the degree of Master of Science. Of these, at least sixteen are prescribed by the department sponsoring the degree; the remaining are elective, the student choosing those which best serve his purpose. The subjects selected must be correlated with the approved program, indicating a definite objective. The major objective of the approved program may be one of penetration and specialization in a given field, or it may be one of breadth of training in a general field at a high professional level. In each case the student must be able to comply with the prerequisites established for each course. Changes in a student's approved program may be made only upon approval of the major department and of the Dean of the Graduate Division.

Transfer of Credits, Study Load, Grades, Theses

Not more than eight semester hours of graduate credit may be transferred from other institutions toward the degree of Master of Science at Northeastern. Grades in courses offered for transfer must be B or higher. Acceptance of credits for transfer will not be approved until the student is admitted to candidacy, and then only if the work submitted for transfer credit is consonant with the objective of the approved program.

All graduate students are limited to a program of four semester hours of course work per semester unless granted special permission by the Committee on Engineering Graduate Study to carry a heavier course load. Thus, those who carry two evenings a week (four semester hours of course work) continuously for both semesters will complete the requirements of thirty semester hours for the degree within four years. Some students may find it possible to shorten this period to three years by enrolling in the Summer Sessions.

Course credits earned on the program of graduate study are valid for a maximum period of eight years.

The academic average of the grades earned in the thirty semester hours of work required for the master's degree must be B or better, with no grade below C. The College of Engineering uses a five-point grading scale in which A represents outstanding achievement, B above average achievement, C average achievement, D below average achievement, and F failure. Any student who does not maintain a B average in the Graduate Division may be refused the privilege of further graduate registration.

Theses are not required since such projects are seldom feasible in evening curricula. Only under special circumstances will a student be permitted to undertake a thesis in lieu of a portion of his course work. In each case it must be clearly indicated that the thesis work is an integral part of the student's approved program and it must have the prior approval of the department concerned and the Dean of the Graduate Division. When thesis work is undertaken, the student registers for the thesis and pays at the rate of the regular semester hour charge.

Tuition and Fees

The policies governing the amount and the regulations pertaining to the payment of tuition and fees are established by the Executive Council of Northeastern University. The Council reserves the right to change these regulations at any time. Such changes will apply to students currently enrolled as well as new applicants for admission.

Checks should be drawn payable to "Northeastern University."

No certificate of honorable dismissal will be issued any student who has not fully met his financial obligations to the University.

Tuition: The charge for tuition is at the rate of $20 per semester hour, or $40 per half year for a two semester hour credit course. Tuition statements will be mailed to the students by the Student Accounts Office and are payable on or before the date specified.

Late Payment Fee: A late payment fee of $2.00 is charged a student who fails to pay his tuition or other charges on or before the date specified by the University.

Make-up Final Examination Fee: Each make-up examination must be specially prepared and administered. To defray this expense a charge of $5.00 is made for each make-up final examination.

Matriculation Fee: Regular students who are eligible for degree candidacy and who desire to apply for the Master of Science degree are required to pay a $10.00 matriculation fee. Applicants who are graduates of one of the schools of Northeastern University are not subject to this fee.

Graduation Fee: The University graduation fee of $20 is charged those who are candidates for the Master of Science degree, and is payable on or before May 1 of the year in which the student expects to graduate.

Refund of Tuition

Any requests for a pro-rated refund of tuition in a course or courses must be made at the time the student notifies the Graduate Division of his intention to withdraw from a particular course or courses. The request for a refund should be made in a letter addressed to the Dean of the Graduate Division, College of Engineering, stating the reasons which necessitated the withdrawal. This request for a partial refund of tuition will be given careful consideration by the Committee on Withdrawals and the student will be notified as to its decision.

No refund of tuition will be granted a student who has attended a course beyond the fifth week of a regular semester.

Veterans

Veterans who expect to obtain educational benefits from the Veterans Administration should visit the Northeastern University Veterans Office, Room 250R, Richards Hall, prior to registration. The Veterans Office at Northeastern University is operated by the University and is prepared to give any assistance the veteran may require in obtaining Veterans benefits.

Class Hours, Instructional Calendar

During the First and Second Semesters each course meets one evening per week from 7:00 to 9:00 p.m. (except when stated otherwise) throughout the semester, which consists of sixteen class periods and one week devoted to examinations. In the Summer Session each course meets two evenings per week from 7:00 to 9:00 p.m. for a period of eight weeks followed by one week devoted to examinations. For opening and closing dates of these sessions, consult the Academic Calendar on page 6 of this Bulletin.

Interview and Registration Dates, Office Hours, and Class Schedules

For dates of the interview and registration periods and office hours, consult the Academic Calendar and the back of the front cover. The registration circulars issued in August, January, and May provide information regarding class meeting times, room assignments, and teaching staff as well as listing the course offerings for the First Semester, Second Semester, and Summer Session, respectively. Copies of these circulars may be obtained from the Office of the Dean of the Graduate Division, College of Engineering, Northeastern University, Boston 15, Massachusetts, or by calling COpley 7-6600.

Curriculum Requirements

A summary of the specific curriculum requirements for the degree of Master of Science is listed for each curriculum. The Dean of the Graduate Division will be glad to confer with students in regard to their individual needs in order that they may select courses of study that will be most helpful to them. Students who desire to pursue a degree program should consult the section in this Bulletin on "Requirements for Admission to Candidacy for a Master's Degree" and also the section on "Requirements for the Degree of Master of Science."

Civil Engineering

Curriculum Requirements for the Degree of Master of Science in Civil Engineering

Required Courses: (16 Semester Hours)

(1) STRUCTURES MAJOR	Sem. Hrs.	(2) SANITARY-HYDRAULICS MAJOR	Sem. Hrs.
G1.401, 402, 403 Indeterminate Structures	6	G1.201, 202 Sanitary Engineering	4
		G1.203 Sanitary Chemistry	2
G1.503, 504, 505 Soil Mechanics	6	G1.204 Sanitary Bacteriology	2
		G1.205a, 205b Sanitary Analysis	4
G1.601, 602 Design of Structures	4	G1.206a, 206b Sanitary Laboratory	4
	16		16

Preferred Elective Courses: (14 semester hours may be elected from the following preferred elective courses; elective courses may be selected from among the other courses in the Graduate Division only with specific prior approval)

(1) STRUCTURES MAJOR	Sem. Hrs.	(2) SANITARY-HYDRAULICS MAJOR	Sem. Hrs.
G1.213, 214 Hydrology	4	G1.207 Microscopy of Water	2
G1.501, 502 Cement and Concrete Technology	4	G1.208 Industrial Waste	2
G1.506 Soil Testing Laboratory	2	G1.209 Stream Sanitation	2
G2.200 Advanced Mechanics of Materials	2		
G2.201, 202 Theory of Elasticity	4	G1.210 Public Health Engineering	2
G2.203, 204 Elastic Stability	4	G1.211, 212 Advanced Hydraulics	4
G2.213, 214 Advanced Dynamics	4		
G14.101, 102 Advanced Mathematics	4	G1.213, 214 Hydrology	4

Mechanical Engineering

Curriculum Requirements for the Degree of Master of Science in Mechanical Engineering

Required Courses: (16 Semester Hours)

(1) MECHANICS MAJOR	Sem. Hrs.	(2) HEAT-POWER MAJOR	Sem. Hrs.
G2.201, 202		G2.301, 302	
Theory of Elasticity	4	Heat Transfer	4
G2.213, 214		G2.311, 312	
Advanced Dynamics	4	Advanced Thermodynamics	4
G14.101, 102		G2.501, 502	
Advanced Mathematics	4	Power Plant Economics	4
G15.101, 102		G14.101, 102	
Theoretical Physics	4	Advanced Mathematics	4
	16		16

Preferred Elective Courses: (14 semester hours may be elected from the following preferred elective courses; elective courses may be selected from among the other courses in the Graduate Division only with specific prior approval)

(1) MECHANICS MAJOR	Sem. Hrs.	(2) HEAT-POWER MAJOR	Sem. Hrs.
G2.203, 204		G2.401	
Elastic Stability	4	Pumps	2
G2.205		G2.411, 412	
Experimental Stress Analysis	2	Gas Turbines	4
G2.211, 212		G2.511, 512	
Vibration Theory and Applications	4	Power Plant Design	4
G2.221, 222		G2.601	
Fluid Mechanics	4	Refrigeration	2
G2.301, 302		G2.611	
Heat Transfer	4	Air Conditioning	2
G2.311, 312		G15.101, 102	
Advanced Thermodynamics	4	Theoretical Physics	4

Electrical Engineering

Curriculum Requirements for the Degree of Master of Science in Electrical Engineering

Required Courses: (16 Semester Hours)

(1) ELECTRONICS-COMMUNICATION MAJOR	Sem. Hrs.	(2) ELECTRIC-POWER MAJOR	Sem. Hrs.
G3.401, 402		G3.401, 402	
Transients in Linear Systems	4	Transients in Linear Systems	4
G3.901, 902		G3.611, 612	
Electric Circuit Theory	4	Advanced A-C Machinery	4
G14.101, 102		G3.911, 912	
Advanced Mathematics	4	Electric Power Circuits	4
G15.101, 102		G14.101, 102	
Theoretical Physics	4	Advanced Mathematics	4
	16		16

Preferred Elective Courses: (14 semester hours may be elected from the following preferred elective courses; elective courses may be selected from among the other courses in the Graduate Division only with specific prior approval)

(1) ELECTRONICS-COMMUNICATION MAJOR

	Sem. Hrs.
G3.101, 102 Servomechanisms	4
G3.201, 202 Pulse Circuits	4
G3.301, 302 Theory of Microwaves	4
G3.501, 502 Communication Theory	4
G3.601, 602 Industrial Electronics	4
G3.701, 702 Electronic Engineering	4
G3.801, 802 Applications of Microwaves	4

(2) ELECTRIC-POWER MAJOR

	Sem. Hrs.
G3.311 High-Voltage Engineering	2
G3.411 Power System Stability	2
G3.412 Protective Relaying	2
G3.613 Electronic Control	2
G3.614 Electrical Machinery Design	2
G3.915 Electric Power Distribution	2

Chemistry

Curriculum Requirements for the Degree of Master of Science in Chemistry

Required Courses: (24 Semester Hours)

		Sem. Hrs.
G11.111, 112	Advanced Inorganic Chemistry	4
G11.235, 236	Advanced Organic Chemistry	4
G11.331, 332	Advanced Physical Chemistry	4
	Other courses in Chemistry or Chemical Engineering with at least 6 semester hours in Chemistry	12
		24

Elective Courses: (6 semester hours may be elected from among the Chemistry, Chemical Engineering, Mathematics, and/or Physics graduate courses of the Graduate Division; elective courses may be selected in other fields only with specific approval)

Mathematics-Physics

Curriculum Requirements for the Degree of Master of Science in Mathematics-Physics

Required Courses: (16 Semester Hours)

		Sem. Hrs.
G14.101, 102	Advanced Mathematics	4
G14.320	Complex Variables	2
G15.101, 102	Theoretical Physics	4
G15.200	Modern Physics	2
	Other Mathematics-Physics courses	4
		16

Elective Courses: (14 semester hours may be elected from among the Mathematics-Physics courses; students majoring in Mathematics-Physics are encouraged to minor in some field of engineering and are permitted to select courses in that field provided they obtain prior approval)

Communications

Curriculum Requirements for the Degree of Master of Science in Communications

Required Courses: (16 Semester Hours)

		Sem. Hrs.
G3.501, 502	Communication Theory	4
G3.901, 902	Electric Circuit Theory	4
G14.101, 102	Advanced Mathematics	4
G15.101, 102	Theoretical Physics	4
		16

Preferred Elective Courses: (14 semester hours may be elected from the following preferred elective courses; elective courses may be selected from among the other courses in the Graduate Division only with specific prior approval)

		Sem. Hrs.
G3.201, 202	Pulse Circuits	4
G3.211, 212	Television Circuits	4
G3.401, 402, 403	Transients in Linear Systems	6
G3.503, 504	Filtering and Prediction	4
G3.605, 606	Transistor Circuit Engineering	4
G3.701, 702	Electronic Engineering	4
G14.221	Mathematical Statistics	2
G14.230	Probability	2
G14.241	Modern Algebra	2
G15.720	Kinetic Theory and Statistical Mechanics	2

Summary of Graduate Courses
Civil Engineering

Course Number

G1.110	Geodetic Surveying
G1.113, 114	Engineering Photogrammetry
G1.201, 202	Sanitary Engineering
G1.203	Sanitary Chemistry
G1.204	Sanitary Bacteriology
G1.205a, 205b	Sanitary Analysis
G1.206a, 206b	Sanitary Laboratory
G1.207	Microscopy of Water
G1.208	Industrial Waste
G1.209	Stream Sanitation
G1.210	Public Health Engineering
G1.211, 212	Advanced Hydraulics
G1.213, 214	Hydrology
G1.401, 402, 403	Indeterminate Structures
G1.501, 502	Cement and Concrete Technology
G1.503, 504, 505	Soil Mechanics and Foundation Engineering
G1.506	Soil Testing Laboratory
G1.601, 602	Design of Structures
G1.605	Prestressed Concrete
G1.951, 952	Topics in Civil Engineering

Mechanical Engineering

Course Number

G2.200	Advanced Mechanics of Materials
G2.201, 202	Theory of Elasticity
G2.203	Theory of Elastic Stability
G2.205	Experimental Stress Analysis
G2.207	Theory of Plasticity
G2.211, 212	Vibration Theory and Applications
G2.213, 214	Advanced Dynamics
G2.217	Non-Linear Vibrations
G2.221, 222	Fluid Mechanics
G2.225	Dynamics of Viscous Flow
G2.230	Bearings and Lubrication
G2.240	Kinematics
G2.250	Advanced Machine Design
G2.260	Dynamical Problems in Machine Design
G2.269	Elastic Energy Theory
G2.301, 302	Heat Transfer
G2.311, 312	Advanced Thermodynamics
G2.401	Pumps
G2.402	Fans and Blowers
G2.405	Hydraulic Machinery
G2.411, 412	Gas Turbines
G2.501, 502	Power Plant Economics
G2.511, 512	Power Plant Design
G2.601	Refrigeration
G2.611	Air Conditioning
G2.701, 702	Metallography
G2.800	Automatic Control Engineering
G2.951, 952	Topics in Mechanical Engineering

Electrical Engineering

Course Number

G3.101, 102	Servomechanisms
G3.111	Metadyne Theory
G3.201, 202	Pulse Circuits
G3.204	Digital Computer Coding and Logic
G3.211	High-Frequency Television Circuits
G3.212	Low-Frequency Television Circuits
G3.215	Computing and Control Devices
G3.221, 222	Radar Engineering
G3.301, 302	Theory of Microwaves
G3.311	High Voltage Engineering
G3.401, 402, 403	Transients in Linear Systems
G3.411	Power System Stability
G3.412	Protective Relaying, as Applied to Power Systems
G3.501, 502	Communication Theory
G3.503, 504	Filtering and Prediction
G3.505	Engineering Acoustics
G3.601, 602	Industrial Electronics
G3.605, 606	Transistor Circuit Engineering
G3.611, 612	Advanced Alternating-Current Machinery
G3.613	Electronic Control of Power Equipment
G3.614	Electrical Machinery Design
G3.701, 702	Electronic Engineering
G3.705, 706	Electron Tube Engineering
G3.801, 802	Application of Microwaves
G3.901, 902	Electric Circuit Theory
G3.911, 912	Electric Power Circuits
G3.915	Electric Power Distribution
G3.951, 952	Topics in Electrical Engineering

Chemical Engineering

Course Number

G4.101	Distillation
G4.102	Gas Absorption
G4.103	Extraction and Crystallization
G4.201, 202	Process Heat Transfer
G4.230	Modern Engineering Materials
G4.320	Advanced Chemical Engineering Design
G4.325	Graduate Industrial Chemistry
G4.501	Fundamentals of Instrumentation
G4.502	Industrial Process Control
G4.601, 602	Chemical Engineering Kinetics
G4.611, 612	High-Polymer Theory and Practice
G4.810	Chemical Engineering Plant Design
G4.820	Economics and the Chemical Industry
G4.951, 952	Topics in Chemical Engineering

Chemistry

Course Number

G11.111, 112	Advanced Inorganic Chemistry
G11.235, 236	Advanced Organic Chemistry
G11.240	Mechanism of Organic Reactions
G11.244	Biochemistry
G11.331	Advanced Physical Chemistry
G11.332	Advanced Physical Chemistry
G11.333	Photochemistry
G11.336	Reaction Kinetics
G11.340	Nuclear Chemistry
G11.412	Theory of Optical Methods of Chemical Analysis
G11.413	Theory of Electrochemical Methods of Analysis
G11.951, 952	Topics in Chemistry

· *Mathematics*

Course Number

G14.50	Elementary Differential Equations
G14.101	Advanced Mathematics
G14.102	Advanced Mathematics
G14.105	Application of Mathematics to Engineering Problems
G14.200	Numerical and Graphical Methods for Engineers
G14.203	Nomography
G14.204	Finite Differences
G14.205	Difference Equations
G14.207	Modern Calculational Methods
G14.210	Theory of Equations
G14.220	Statistics for Engineers
G14.221	Mathematical Statistics
G14.224	Experimental Statistics
G14.230	Probability
G14.240	Matrix Theory
G14.241	Modern Algebra
G14.245	Group Theory and Applications
G14.300	Fourier Series and Boundary Value Problems
G14.310	Vector Analysis
G14.320	Functions of a Complex Variable
G14.323	Theory of Functions of a Real Variable
G14.330	Modern Operational Methods
G14.340	Calculus of Variations
G14.510	Intermediate Differential Equations
G14.530	Partial Differential Equations
G14.540	Non-Linear Differential Equations
G14.550	Integral Equations
G14.600	Differential Geometry
G14.700	Topology
G14.901, 902	Topics in Mathematics

Physics

Course Number

G15.101, 102	Theoretical Physics
G15.103, 104	Engineering Physics
G15.111, 112	Mathematical Physics
G15.200	Modern Physics
G15.211, 212	Introduction to Quantum Theory
G15.213, 214	Quantum Mechanics
G15.220	Introduction to Nuclear Physics
G15.222, 223	Advanced Nuclear Physics
G15.225	Physics of Semi-conductors
G15.226	Transistor Physics
G15.231, 232	Solid State Physics
G15.233, 234	Theory of Solids
G15.240	Applied Spectroscopy
G15.250	Theory of Spectra
G15.315, 316	Theoretical Mechanics
G15.400	Vibration and Sound
G15.500	Electricity and Magnetism
G15.503, 504	Electromagnetic Theory
G15.611	Physical Optics
G15.621, 622	Advanced Optics
G15.710	Thermodynamics
G15.720	Kinetic Theory and Statistical Mechanics
G15.741, 742	Chemical Physics
G15.901, 902	Topics in Physics

Communications

(See the courses listed under Electrical Engineering, Mathematics, and Physics)

Description of Graduate Courses

The following synopses of courses of instruction offered by the several departments are given so that prospective students may obtain a comprehensive view of the scope of each course. Preparation courses are indicated in each instance. All courses are not offered every year, but the course offerings will be arranged in such a manner that students who desire to do so may make continuous progress toward the degree.

The number of students enrolled in each class will be limited to permit effective teaching at the graduate level and the University reserves the right to cancel any course for which an insufficient number of students apply. No student may enroll in more than two courses at one time without special permission of the Dean of the Graduate Division.

One semester hour credit is awarded for the work represented by a class meeting for one hour each week for one regular sixteen-week semester. Each of the following courses yields two semester hours credit, except when stated otherwise.

Civil Engineering

The civil engineer who takes up graduate work in this field will find that the graduate treatment of the subject is in the direction of increased comprehensiveness. He will find that some of the topics to which he was introduced as an undergraduate are now taken up with an extended consideration of the variables and parameters involved. Particular features of problems which he encountered in his undergraduate curriculum are now discussed in some detail, and various problems which could not be adequately considered earlier are now investigated. The combination of a systematic study of the methods used in the analysis of problems with a discussion of their practical aspects results in a training which provides the graduate student with a sound and well-rounded background.

G1.110   Geodetic Surveying

Preparation: A two semester undergraduate course in Surveying

Course Content: A study of the methods pertinent to control surveys of high precision. Triangulation observations and calculations. Base line measurements and the application of required corrections. Theory and use of geographical co-ordinates. Precise traverse measurements. First-order leveling procedures. Solar and stellar observations.

G1.113
G1.114   Engineering Photogrammetry

Preparation: A two semester undergraduate course in Surveying

Course Content: A study of the basic principles of photogrammetry as applied to the general field of civil engineering. The following items are studied: geometry of perspective, iconometry, the camera, terrestrial and aerial photographs, horizontal and vertical control, tilt, radial triangulation, mosaics, stereo-comparator, and stereo-photogrammetry.

G1.201
G1.202   *Sanitary Engineering*   (Offered in 1954-55)

Preparation: A two semester undergraduate course in Sanitary Engineering
Course Content: The theory and design of water treatment works, including the following topics: aerators, reaction chambers, sedimentation tanks, water softening, iron removal, slow sand filters, rapid sand filters, and disinfection. The study of the theory and design of sewerage works, such as grit chambers, primary settling tanks, spiral flow tanks, trickling filters, dosing tanks, drying beds, Imhoff tanks, digesters, and gas storage tanks.

G1.203   Sanitary Chemistry

Preparation: Two semesters of undergraduate General Chemistry (with lab.)
Course Content: An advance course of general chemistry stressing the basic chemical laws as they apply to the field of sanitary engineering. The course would encompass the following: fundamental laws, stoichiometry, gas laws, atomic structure, periodic system, hydrogen, alkali metals, halogens, oxygen group, aluminum group, carbon, nitrogen group, iron and manganese, acidimetric normality, oxidation and reduction, and oxidation potential.

G1.204   Sanitary Bacteriology

Preparation: G1.203 Sanitary Chemistry
Course Content: A course of study in the field of bacteriology with emphasis on those phases of bacteriology employed by the sanitary engineer, namely, growth, form, environment, enzymes, disinfection, carbon cycle, nitrogen cycle, molds, yeasts, iron bacteria, sulphur bacteria, bacteriology of water and sewage, bacteriology of milk, swimming pools, and quantitative bacteriology.

G1.205a
G1.205b   *Sanitary Analysis*   (Offered in 1954-55)

Preparation: G1.203 Sanitary Chemistry and G1.204 Sanitary Bacteriology
Course Content: This is a laboratory course employing standard methods of analysis for water and sewage, both chemically and bacteriologically. Instruction is given in the proper methods of sampling, making standard solutions and reagents, preparation of media, methods of staining and their significance to the art of sanitary interpretation. The writing and interpretation of sanitary reports are stressed.

G1.206a
G1.206b   *Sanitary Laboratory*

Preparation: G1.205 Sanitary Analysis
Course Content: Laboratory studies and reports are submitted on the following topics: sludge digestion, activated sludge, sludge filtration, filtration studies, coagulation, aeration, water softening, disinfection, chlorination, and **B.O.D.** studies.

G1.207   Microscopy of Water

Preparation: G1.203 Sanitary Chemistry and G1.204 Sanitary Bacteriology
Course Content: An applied course in microscopy covering the following items: microscopic organisms, collection and examination of samples, odors and tastes, limnology both physical and chemical, rheology, purification of streams, algae control, and determinative microscopy.

G1.208   *Industrial Waste*

Preparation: G1.203 Sanitary Chemistry and G1.204 Sanitary Bacteriology
Course Content: A study of various manufacturing processes and their waste problems, together with methods of utilization, treatment, and disposal of their waste products. Specific processes that can be adapted to specific wastes and their necessary concomitant structures are studied with the viewpoint of designing suitable treatment plants.

G1.209   *Stream Sanitation*

Preparation: G1.203 Sanitary Chemistry and G1.204 Sanitary Bacteriology
Course Content: This course deals with the basic principles of stream sanitation and corrective control methods. The topics taken up in this course include the following: aerobic and anaerobic decomposition, oxygen balance, carbon dioxide, oxidation, reduction, bacterial pollution, industrial pollution, sewage pollution, water supply, shellfish, fish life, riparian rights, recreation, and general stream sanitation.

G1.210   *Public Health Engineering*

Preparation: G1.203 Sanitary Chemistry and G1.204 Sanitary Bacteriology
Course Content: This course is designed for those men who are interested in the art of administering sanitary engineering for public health. It stresses public health through sound engineering practice.

G1.211
G1.212   *Advanced Hydraulics*

Preparation: A two semester undergraduate course in Hydraulics
Course Content: An advanced course in Hydraulics, presenting the following concepts: energy, continuity, momentum, flow nets, significance of the Froude and Reynolds numbers, fluid motion in a closed conduit, open channels, surface resistance, dimensional analysis, dynamic similarity, theory of models and pipe networks. The course continues with further study of open channel flow, backwater curve, drawdown curve, hydraulic jump, location of hydraulic jump, transitions in channels, theory of waves, cavitation and water hammer.

G1.213
G1.214   *Hydrology*   (Offered in 1954-55)

Preparation: Differential and Integral Calculus
Course Content: A study of the principles of statistical methods as applied to Hydraulics and Sanitary Engineering. The collection and sampling of raw data with an aim to predicting such phenomena as precipitation, run-off, floods and stream flow. Analysis, correlation, and accuracy of these predictions are studied and compared by arithmetic and graphical methods.

G1.401
G1.402   *Indeterminate Structures*   (Offered in 1954-55)

Preparation: Differential and Integral Calculus, Theory of Structures
Course Content: Reconsideration of basic methods of analysis to be employed, indeterminateness, stability, virtual work, Castigliano's Theorem, moment-area,

elastic weights, Williott-Mohr, and conjugate beam. Analysis and determination of deformation of continuous structures and trusses with redundant members. Applications of virtual work, Castigliano's Theorem of least work and slope-deflection methods.

G1.403   Indeterminate Structures   (Offered in 1954-55)

Preparation: G1.402 Indeterminate Structures

Course Content: A continuation of G1.401 and 402. Analysis and deformation of frames by the moment and shear distribution process. The theorem of three moments and the fixed point method. Influence lines for continuous beams and trusses and domes, framed space structures, curved beams loaded normal to the plane of curvature. Analysis and deformation of arches and cables.

G1.501
G1.502   Cement and Concrete Technology

Preparation: Materials of Engineering

Course Content: Manufacture, physical testing, and properties of Portland cement, control of concrete materials, history and properties of aggregates, concrete mix design, factors affecting the properties of plastic concrete, and cement control. Three laboratory periods will be held during the first semester.

Properties of hardened concrete, cement dispersion and wetting, effect of aggregate characteristics on properties of concrete, function and mechanism of air entrainment, practical applications, dynamic modulus of concrete, effect of alkalies on aggregate having active hydro-siliceous materials, new developments in concrete materials, pump-crete methods, pozzolanic materials, deterioration of concrete due to natural waters, intrusion (Prepakt) concrete, soil cement. Two laboratory periods will be held during the second semester.

G1.503   Soil Mechanics and Foundation Engineering   (Offered in 1954-55)

Preparation: Differential and Integral Calculus

Course Content: Phase relationships; soil classification and identification; subsurface explorations; seepage and ground water flow; theory of consolidation.

G1.504   Soil Mechanics and Foundation Engineering   (Offered in 1954-55)

Preparation: G1.503 Soil Mechanics and Foundation Engineering, or its equivalent

Course Content: Stress distribution, settlement analyses; stress deformation and strength properties; stability of slopes and embankments.

G1.505   Soil Mechanics and Foundation Engineering   (Offered in 1954-55)

Preparation: G1.504 Soil Mechanics and Foundation Engineering, or its equivalent

Course Content: Lateral pressures; retaining wall and bulkhead design; bearing capacity of footings, piers, pile foundations; practical applications; uncertainties in design assumptions.

G1.506 Soil Testing Laboratory (Offered in 1954-55)

Preparation: G1.503 Soil Mechanics and Foundation Engineering

Course Content: A laboratory course covering classification tests (Atterberg limits, specific gravity and grain size analysis), compaction, permeability, consolidation, strength characteristics (unconfined compression, triaxial compression and California Bearing Ratio) and field control tests. (Class size limited to 15 students.)

G1.601
G1.602 Design of Structures (Offered in 1953-54)

Preparation: G1.403 Indeterminate Structures

Course Content: Advanced structural design in steel, concrete and timber with emphasis on the economics of design and on those aspects of design least readily obtained through self-study. Riveting and welding. Riveted and welded connections. Wind bracing connections in tall building frames. Design of the rigid frame bridge. Design of simple structures for dynamic loads. Material may be adapted to the particular needs or interests of the class.

G1.605 Prestressed Concrete (Offered in 1954-55)

Preparation: Undergraduate course in reinforced concrete design, G1.401 Indeterminate Structures

Course Content: Basic design concepts. Properties of materials used for prestressing. Review of research in prestressed concrete. Construction practice covering various methods of both pre-tensioning and post-tensioning used to date; discussion of tests. Economics of prestressed concrete.

G1.951
G1.952 Topics in Civil Engineering

Preparation: Consent of the instructor

Course Content: Various topics of recent interest in civil engineering. The subject matter will vary from year to year.

Mechanical Engineering

The rapid strides that are now taking place in the direct application of scientific techniques to the solution of many modern engineering problems make it imperative that the present-day engineer be competently trained in the fundamentals that are basic to all branches of engineering. For the mechanical engineer, in particular, the task of preparation is, in many respects, unusually severe, for the ramifications of his problems often lead into all branches of engineering and science. Furthermore, a solution which is sufficient today may prove to be inadequate tomorrow. The curricula which have been set up in mechanical engineering, both in heat-power and in mechanics, have been designed with the view in mind of providing the mechanical engineering student with a background which will enable him to meet the challenge of his profession.

G2.200　*Advanced Mechanics of Materials*　(Offered in 1954-55)

Preparation:　Strength of Materials

Course Content:　Stresses at a point, theories of failure, thick cylinders under elastic and plastic deformation, shear stress distribution, location of shear center, bending stresses due to non-symmetrical loading, bending of flat plates, curved beams, the significance of fatigue, stress concentration, the resistance of materials to stress. Experimental methods and practical problems are discussed.

G2.201
G2.202　*Theory of Elasticity*　(Offered in 1954-55)

Preparation:　G14.102 Advanced Mathematics, Strength of Materials

Course Content:　Analysis of stress and strain in two and three dimensions, principal stresses and strains, differential equations of equilibrium, boundary conditions, compatibility equations, stress function, determination of displacements, equilibrium equations in terms of displacements. Stress concentration near a load and stresses set up by unequal temperature distribution. Strain energy methods. Solution of problems in two and three dimensions.

G2.203　*Theory of Elastic Stability*

Preparation:　G14.102 Advanced Mathematics, Dynamics

Course Content:　Buckling of compression members with and without transverse loads; eccentricity and curvature; consideration of loads causing stresses above the elastic limit; buckling of tubes and shells, general failure of columns.

G2.205　*Experimental Stress Analysis*

Preparation:　G2.202 Theory of Elasticity

Course Content:　Theoretical and practical consideration of methods of determining stress distributions. The fundamental theory basic to the various methods will be emphasized and a comparison of the results obtainable by these methods will be made. Photoelasticity, brittle lacquers, strain gauge techniques and instrumentation are a few of the methods given consideration.

G2.207　*Theory of Plasticity*

Preparation:　G2.202 Theory of Elasticity

Course Content:　The mathematical theory of plasticity and its engineering applications; the laws of plastic flow; general stress-strain relations, plastic flow in thick-walled bodies, plastic torsion.

G2.211
G2.212　*Vibration Theory and Applications*

Preparation:　Differential Equations, Dynamics

Course Content:　One degree systems, natural frequencies, forced vibrations; dry and viscous friction; many degrees of freedom; non-linear and self-induced vibrations, torsional vibrations; balancing; mechanical, electrical, and acoustical analogies; distributed masses, beams, methods of Rayleigh and Ritz, vibration isolation and prevention, vibration measuring instruments.

G2.213
G2.214 Advanced Dynamics (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics, Dynamics

Course Content: A presentation of the general principles of dynamics together with their application to various engineering problems. Dynamics of a particle, dynamics of a system of particles, dynamics of a system of particles with constraints, generalized coordinates, virtual work. Lagrange's equations, Hamilton's principle, small oscillations of conservative systems, rotation of a rigid body, Eulerian equations of motion.

G2.217 Non-Linear Vibrations

Preparation: G14.102 Advanced Mathematics, G2.214 Advanced Dynamics or equivalent

Course Content: Linear vibrations; free vibrations of conservative systems with non-linear restoring forces; effects of damping; forced oscillation of systems with non-linear restoring forces; self-oscillating systems.

G2.221
G2.222 Fluid Mechanics (Offered in 1954-55)

Preparation: Hydraulics, Dynamics, G14.102 Advanced Mathematics

Course Content: Principles of fluid flow in two dimensions, flux function, velocity potential; introduction to complex variables, analytic functions, orthogonal nets, conformal maps; two dimensional flow problems; free streamlines; introduction to vector analysis, three dimensional fields; flow around immersed bodies.

G2.225 Dynamics of Viscous Flow

Preparation: G2.222 Fluid Mechanics, or its equivalent

Course Content: The general Navier-Stokes equations for viscous flow, boundary layer theory, study of the work of von Karman and Blasius, study of flow stability criteria, laminar flow, turbulence, and viscous flow around various bodies.

G2.230 Bearings and Lubrication (Offered in 1954-55)

Preparation: Dynamics, Hydraulics

Course Content: Viscosity. Effect of pressure and temperature on viscosity. Flow of fluids in small channels. Hydrostatic methods of lubrication and the hydrodynamic theory of lubrication applied to thrust and journal bearings. Ball and roller bearings. Lubricants and bearing materials.

G2.240 Kinematics

Preparation: Undergraduate course in Kinematics

Course Content: Geometry of constrained motion, with applications to point paths; kinematic analysis and synthesis; types of mechanisms; study of geometry of constrained motion in two and three dimensions.

G2.250   Advanced Machine Design   (Offered in 1954-55)
Preparation: Dynamics, Machine Design
Course Content: Analysis, layout, and design of machines and machine parts.

G2.260   Dynamical Problems in Machine Design
Preparation: Dynamics, Machine Design
Course Content: Methods for determining dynamic characteristics of mechanisms. Design of devices for specific velocities and accelerations under given force systems.

G2.269   Elastic Energy Theory
Preparation: G14.102 Advanced Mathematics, G2.200 Advanced Mechanics
of Materials, or equivalent
Course Content: Degree of indeterminacy of structures. Distribution of energy and Maxwell's theorem. Curved beams, open and closed rings, columns; least work.

G2.301
G2.302   Heat Transfer   (Offered in 1954-55)
Preparation: G14.102 Advanced Mathematics, Dynamics, Elements of Heat
Transfer.
Course Content: Review of thermal conductivity, thermal resistance, film coefficients, composite walls, critical radius of insulation, logarithmic mean temperature difference and over-all coefficient of heat transfer. Reynolds analogy, dimensional analysis, Reynolds, Prandtl and Nusselt numbers, experimental correlation and equivalent diameters.
   Fluid friction, pressure drops, Wilson plot for condensers, condensation, Nusselt's derivation, radiation, basic definition, Lambert's law, theoretical aspects of radiation processes, heat transfer to boiling liquids. Heat transfer by conduction, steady state, two dimensional applications and cylindrical coordinates, internal sources, finite difference and relaxation type solutions, field mapping solutions, electrical analogy solutions.

G2.311
G2.312   Advanced Thermodynamics   (Offered in 1954-55)
Preparation: Differential Equations, Thermodynamics
Course Content: Review of first and second laws of thermodynamics, general thermodynamic relations, steady flow, thermodynamic potentials; equations of state, properties of fluids; equilibrium of systems, conditions of stability, gaseous systems, absolute value of gas entropy; thermodynamics of liquids and dilute solutions; thermodynamics of electrical phenomena, paramagnetism, thermodynamics of radiation.

G2.401   Pumps   (Offered in 1954-55)
Preparation: Hydraulics
Course Content: Flow of fluids in pipes and ducts, head on pumps, fans and blowers; development of head, net positive suction head, cavitation and specific speed of pumps; affinity laws, selection of pumps to suit various operating con-

ditions and methods of driving; automatic operation, types of construction and materials used, methods of priming centrifugal pumps, pumping of chemicals, oils and sludges, special problems of pump installation and operation, water hammer in pump discharge lines.

G2.402   Fans and Blowers

Preparation: Thermodynamics, Hydraulics
Course Content: Flow of air in pipes and ducts, fan characteristics and laws, various types of fan wheels, inlet and outlet connections, fan capacity control, fan selection and testing. Compression of air and gases, flow in pipes, head on blowers, performance curves, effect of changes in speed and inlet conditions, construction, regulation, selection, installation and testing. Axial flow fans and blowers. Positive pressure blowers.

G2.405   Hydraulic Machinery

Preparation: Hydraulics
Course Content: Principles of operation of hydraulic machines; impulse, reaction, and propeller turbines. Turbine settings. Regulation and governoring. Pump-turbine units. Fluid couplings. Propulsion machinery.

G2.411
G2.412   Gas Turbines

Preparation: G14.102 Advanced Mathematics, Thermodynamics
Course Content: General thermodynamic, aerodynamic theory of axial flow turbines and compressors, blade and flow path design, leakage seals, radial flow machines. Mechanical design problems of high-speed turbo machinery, theory and design of heat exchangers, combustors, performance of gas turbine plant under varying operation conditions.

G2.501
G2.502   Power Plant Economics   (Offered in 1954-55)
Preparation: Thermodynamics

Course: Content: Cost of power and heat as required by various types of factories, hospitals and other large buildings. Distribution of steam to groups of buildings for the most economical use of steam. Effective use of exhaust and bled steam for process, heat and air conditioning. Costs of power and heat by an isolated plant compared to that of purchased power. Computations covering an isolated steam plant with supplementary Diesel equipment and public utilities breakdown connections.

G2.511
G2.512   Power Plant Design

Preparation: G2.502 Power Plant Economics
Course Content: Latest development in the theory and design of modern power generation for isolated and central stations. Computations for a small central station involving the size and type of boiler, prime movers, feed water heater, pumps, coal handling equipment. Analysis and computations covering equipment for an isolated plant including steam generating units, engines or turbines, condensing equipment, piping and general auxiliaries.

G2.601   Refrigeration   (Offered in 1954-55)

Preparation: Thermodynamics
Course Content: A study of refrigeration cycles and their application, properties of refrigerants, design and selection of heat transfer equipment, and control systems.

G2.611   Air Conditioning

Preparation: Thermodynamics, Elements of Heating and Air Conditioning
Course Content: Complete review of air and water vapor mixtures. Summer cooling load calculations. Performance characteristics of spray, and extended surface, cooling and dehumidifying equipment. Control equipment for summer cooling and dehumidification systems.

G2.701
G2.702   Metallography   (Offered in 1954-55)

Preparation: An undergraduate course in Metallography
Course Content: A brief review of the electron theory and crystallography as applied to metals. Explanation of the binary thermal equilibrium diagrams. Discussion of plastic deformation (creep, slip, twinning, fatigue, recrystallization and grain growth). Microstructures and theory of heat treatment, hardenability and precipitation hardening as applied to cast and wrought plain carbon steels, the common alloyed steels, such as nickel, chromium, manganese, stainless, high speed steels, cemented carbides, wrought iron, malleable, ductile and gray cast irons, the more important commercial non-ferrous metals and alloys of aluminum, copper, lead, etc.

G2.800   Automatic Control Engineering   (Offered in 1954-1955)

Preparation: Differential Equations
Course Content: Fundamental principles of feed-back systems, stability criteria, derivative and integral control, physical components of feed-back systems. This course is intended to give the non-electrical engineer an introduction to automatic control engineering by stressing the fundamental physical principles rather than the electro-mathematical aspects.

G2.951
G2.952   Topics in Mechanical Engineering

Preparation: Consent of the instructor
Course Content: Various topics of recent interest in mechanical engineering. The subject matter will vary from year to year.

Electrical Engineering

The present trend in the field of electrical engineering is toward a greater emphasis on physico-mathematical techniques. Hence, the electrical curricula of the contemporary graduate schools are emphasizing the analytical approach to electrical engineering problems rather than the purely empirical. Accordingly, the courses outlined below have been designed to present particularly the analytical methods used in solving various types of modern electrical engineering problems, without, however, neglecting altogether those practical considerations

necessary for engineering application. Where appropriate, laboratory demonstrations and exercises have been included.

G3.101
G3.102   *Servomechanisms*   (Offered in 1954-55)

Preparation: A-C Theory, Dynamics, Transients in Linear Systems
Course Content: Analysis and synthesis of linear servomechanisms by both transient and steady-state methods. Adjustments and optimum design considerations. Consideration of the various electrical, mechanical, and hydraulic components used in typical servomechanisms. Methods of testing and the formulation of specifications of systems for specific usages.

G3.111   *Metadyne Theory*

Preparation: G3.402 Transients in Linear Systems, A-C Machinery
Course Content: A general study of the amplidyne and related devices, and their application to control problems.

G3.201
G3.202   *Pulse Circuits*   (Offered in 1954-55)

Preparation: Differential Equations, Transients in Linear Systems, Electronics, A-C Theory
Course Content: The principles and techniques of pulse-forming circuits as applied to radar, television and pulse-modulation communication systems. Brief descriptions of these three types of communication systems are given and the basic circuits involved are considered, such as multivibrators, modulators, sweep-generating circuits, blocking oscillators, and delay lines. Emphasis is placed on graphical methods for the analysis and design of such circuits. R-f sources and methods of pulse modulation. Receivers for pulsed signals with emphasis on the analysis and synthesis of the component i-f and video amplifiers. Counting circuits.

G3.204   *Digital Computer Coding and Logic*   (Offered in 1954-55)

Preparation: A bachelor's degree in engineering or science
Course Content: This course is designed as a survey of the basic logic and techniques involved in the design and use of digital computers. Topics discussed will include the following: functions of a computer, logical design, basic components, principles of coding, input and output systems.

Considerable time will be spent on the translation of arithmetical and logical operations into digital computer instructions. Examples will be taken from typical business, engineering, scientific, and real-time control problems. The course will include at least one visit to a large scale computer in the Boston area.

G3.211   *High-Frequency Television Circuits*   (Offered in 1954-55)

Preparation: Differential Equations, A-C Theory, Basic Electronic Circuits
Course Content: Review of amplifier, rectifier, and tuned-circuit principles. Study of the antenna and r-f sections, including noise considerations. Analysis of the video i-f section, including discussion of stagger tuning, tuned amplifier coupling, and traps. Detector and agc circuits; the effect of noise on agc. Video amplifiers and d-c restorers. Laboratory demonstrations of some of the circuits treated above. Principles of color television.

G3.212　Low-Frequency Television Circuits　(Offered in 1954-55)

Preparation:　Differential Equations, A-C Theory, Basic Electronic Circuits

Course Content:　Survey of camera and picture tubes. Analysis of picture standards and of scanning requirements. Electrostatic and electromagnetic deflection and focusing of c-r tubes. Deflection voltage (current) generators. Flyback considerations and television power supplies. Multivibrators, sawtooth and trapezoidal generators. Synchronization requirements and circuits. Blanking signal injection and separation. Laboratory demonstration of the scanning circuits. FM sound section.

G3.215　Computing and Control Devices　(Offered in 1954-55)

Preparation:　G3.202 Pulse Circuits or its equivalent

Course Content: Review of pulse circuit fundamentals. Engineering organization of computers. Boolean algebra; electronic switching circuits, electromechanical components, basic magnetic circuits; reliability techniques; acoustic, electrostatic and magnetic storage techniques; digital control units; transducers, operational-digital techniques; current and future developments.

G3.221
G3.222　Radar Engineering

Preparation:　Basic Electrical Transients, Electronic Circuits

Course Content:　This course emphasizes those aspects of radar engineering not covered in G3.201, 202 Pulse Circuits. Topics considered in detail include pulse receivers, klystrons, magnetrons, modulators, r-f lines, antenna systems, waveguides, cavities, and propagation phenomena. Some time is devoted to discussion of typical radar systems.

G3.301
G3.302　Theory of Microwaves

Preparation:　Basic Field Theory, G15.102 Theoretical Physics, G14.102 Advanced Mathematics

Course Content:　Fundamentals of electromagnetic theory. Field problems involving various coordinate systems. Quasi-stationary phenomena. Maxwell's equations as applied at low and high frequencies. Circuit concepts at high frequencies. Propagation in unbounded and bounded regions.

G3.311　High-Voltage Engineering

Preparation:　A-C Theory

Course Content:　Insulation of the solid and liquid types. Lightning, surge protection in general, and insulation coordination. Corona. Destructive and non-destructive testing methods.

G3.401　Transients in Linear Systems　(Offered in 1954-55)

Preparation:　Differential Equations, A-C Theory, Dynamics

Course Content:　Review of the methods employed in writing the integro-differential equations for electric circuits. Network topology and duality. Selected methods for solving algebraic equations of higher degree. Introduction to the

methods of transformation calculus and complex-frequency concepts. Application of Laplace transforms to the solution of selected linear lumped-parameter electric circuits.

G3.402   Transients in Linear Systems   (Offered in 1954-55)
Preparation: G3.401 Transients in Linear Systems
Course Content: Extension of the methods of G3.401 to cover mechanical and electromechanical systems. Feedback principles, servomechanisms, and stability criteria. Response of systems to impulses and repeated functions. Convolution theory. Introduction to complex-variable theory, integration in the complex plane, and the solution of the inversion integral.

G3.403   Transients in Linear Systems   (Offered in 1954-55)
Preparation: G3.402 Transients in Linear Systems
Course Content: Additional applications of the methods of transformation calculus to linear lumped-parameter and distributed-parameter systems. Linear difference equations and their application. Advanced circuit techniques and oscillation criteria. Methods of analysis applicable to non-linear systems.

G3.411   Power System Stability
Preparation: Polyphase A-C Circuits, A-C Machinery
Course Content: Includes a study of steady-state power limits and transient stability of electric power systems.

G3.412   Protective Relaying, as Applied to Power Systems
Preparation: Polyphase A-C Circuits, A-C Machinery
Course Content: Types of relays, calculation of short-circuit currents, the selection of the proper relay, and the solution of practical relaying problems.

G3.501
G3.502   Communication Theory   (Offered in 1954-55)
Preparation: G14.102 Advanced Mathematics
Course Content: Signal analysis on time and frequency bases. Theory of amplitude, angular and pulse modulation. Probability theory applied to noise analysis. Introduction to information theory for discrete and continuous channels with applications.

G3.503
G3.504   Filtering and Prediction
Preparation: G3.502 Communication Theory, or its equivalent
Course Content: Theory of filtering and prediction of time series and its application in the design of optimum linear systems, based upon the least mean-square error criterion. Examples will be taken from the fields of communication and control.

G3.505   Engineering Acoustics   (Offered in 1954-55)
Preparation: A-C Theory, Differential Equations
Course Content: The psycho-acoustic aspects of sound, characteristics of sound waves and sound transmission systems. Acoustic transducers, measuring equipment and techniques. Engineering applications.

G3.601

G3.602   Industrial Electronics

Preparation: Basic Electronics and Circuits, A-C Theory, Differential Equations

Course Content: The design and analysis of electronic circuits employing phototubes, pulsed-light sources, cathode-ray tubes, etc. Consideration of recently developed circuit elements including saturable reactors, etc. Electronic instrumentation. Magnetic control devices.

G3.605

G3.606   Transistor Circuit Engineering   (Offered in 1954-55)

Preparation: Basic Electronics and Electric Circuits

Course Content: Brief review of transistor physics. Small signal performance. Applications to basic amplifier circuitry. Large signal performance. Applications to switching circuits, oscillators, etc. Emphasis is placed on practical design by graphical and equivalent-circuit techniques.

G3.611

G3.612   Advanced Alternating-Current Machinery   (Offered in 1954-55)

Preparation: Polyphase A-C Circuits, A-C Machinery

Course Content: Special topics concerning transformers, synchronous and asynchronous machine operation. Includes a study of machine reactances, the two-reaction theory, and transient operation.

G3.613   Electronic Control of Power Equipment

Preparation: Basic Electronic Circuits, D-C Machinery

Course Content: Fundamentals of application of industrial control equipment; induction and dielectric heating; regulation and control devices, industrial rectifiers and inverters.

G3.614   Electrical Machinery Design

Preparation: A-C Machinery

Course Content: A study of the methods used in the practical design of transformers, synchronous machines, and induction motors.

G3.701

G3.702   Electronic Engineering   (Offered in 1954-55)

Preparation: Basic Electronics and Electronic Circuits, A-C Theory, G3.402 Transients in Linear Systems, G14.102 Advanced Mathematics

Course Content: Review of basic electronic theory and vacuum-tube circuits. Graphical and equivalent-circuit methods of analysis as applied to Class-A audio and direct-coupled amplifiers. Push-pull vacuum-tube circuits. Class B and C operation. Feed-back amplifiers and regulator circuits. Modulation and demodulation methods.

G3.705

G3.706   Electron Tube Engineering

Preparation: Electronics, G14.102 Advanced Mathematics

Course Content: A fundamental treatment emphasizing the non-circuit aspects

of electron devices, including vacuum tubes, cathode-ray tubes, storage tubes, electronic computer components, etc.

G3.801
G3.802   Application of Microwaves   (Offered in 1954-55)

Preparation: G3.301 Theory of Microwaves
Course Content: Applications of the principles covered in Theory of Microwaves (G3.301, 302) to the analysis of waveguides, cavity resonators, radiators, junctions, and irises. Consideration is given to the practical aspects of microwave circuitry.

G3.901
G3.902   Electric Circuit Theory   (Offered in 1954-55)

Preparation: A-C Theory, Differential Equations
Course Content: Introduction to the concepts of general electric circuit analysis and synthesis. Methods included are the classical image parameter theory and, to a greater extent, the modern procedures using poles and zeros in the complex frequency plane. Detail considerations of two-terminal and four-terminal network synthesis based upon theories of Foster, Cauer, Bode, Guillemin, Brune and Darlington.

G3.911
G3.912   Electric Power Circuits   (Offered in 1954-55)

Preparation: Polyphase A-C Circuits, A-C Machinery
Course Content: Steady state analysis of balanced and unbalanced power circuits by means of symmetrical and related components. Long and short transmission line theory. Study of skin and proximity effects. Electrical characteristics of synchronous and induction machines under abnormal operating conditions.

G3.915   Electric Power Distribution   (Offered in 1954-55)

Preparation: Electric Power Circuits or consent of instructor
Course Content: Loads and their characteristics, including distribution, density, growth, demand, diversity factor, load factor, power factor, power and lighting loads; types of distribution systems, d-c and a-c; primary distribution, including radial and network, substation location, arrangement of primary circuits, regulation, primary voltage; secondary distribution, including radial, network, feeders, transformers, regulation; transformer size, location, loading connections, and characteristics; voltage regulation; protective devices; overhead and underground construction.

G3.951
G3.952   Topics in Electrical Engineering

Preparation: Consent of the instructor
Course Content: Various topics of recent interest in electrical engineering. The subject matter will vary from year to year.

Chemical Engineering

In order to be of service to engineers who are employed in the field of chemical engineering and other allied fields — to assist them in their professional development — the following courses are offered. The offering of these courses does not imply that a master's degree program in chemical engineering will be established. However, the credit for these courses can be submitted under the optional electives in fulfilling the requirements for the Master of Science degree in the other branches of engineering provided that the department sponsoring the degree approves.

G4.101   Distillation

Preparation: An undergraduate course in Unit Operations or its equivalent
Course Content: Review of the physical chemistry background of distillation and rectification covering development of phase equilibria relationships and thermodynamic evaluation of experimental data. Thorough investigation of distillation, including batch, steam and flash, and of the analytical and graphical methods of designing rectifying columns for binary and multicomponent mixtures with and without side steams. Discussions of various efficiencies and design of commercial towers.

G4.102   Gas Absorption

Preparation: An undergraduate course in Unit Operations or its equivalent
Course Content: Brief review of equilibrium considerations. Development of basic rate equations for mass transfer. Study of theoretical relationships (analogies) expressing mass transfer in terms of heat and/or momentum transfer. Review of available mass transfer data — wetted wall, packed, slat, etc., towers and wet bulb psychrometers — considering individual and over-all coefficients. Data are used to test theoretical relationships. Development of methods of extending observed data to other systems and operating conditions. Study of the design methods employed, including multicomponent absorption systems.

G4.103   Extraction and Crystallization

Preparation: An undergraduate course in Unit Operations or its equivalent
Course Content: Discussion of stoichiometry, equilibrium, kinetics, and design techniques in the fields of solvent extraction and crystallization.

G4.201
G4.202   Process Heat Transfer

Preparation: An undergraduate course in Heat and Mass Transfer or its equivalent.
Course Content: A more extensive treatment of those processes of heat transfer usually covered in an undergraduate course. Flow of heat, conduction, convection, radiation; consideration of process heat transfer as applied to the design and performance of heat exchangers and evaporators.

G4.230   Modern Engineering Materials

Preparation: Undergraduate course in Materials of Engineering or equivalent
Course Content: A study of the properties of modern engineering materials, with special emphasis on recent developments.

G4.320   *Advanced Chemical Engineering Design*

Preparation: Bachelor of Science in Chemical Engineering

Course Content: The design of equipment to meet certain specifications, with an emphasis on obtaining an integrated design consonant with technological requirements and economic considerations.

G4.325   *Graduate Industrial Chemistry*

Preparation: Bachelor of Science in Chemical Engineering

Course Content: Application of stoichiometry, thermodynamics, and kinetics to problems common in the more important chemical industries. Emphasis is placed upon the interpretation of experimental data.

G4.501   *Fundamentals of Instrumentation*   (Offered in 1954-55)

Preparation: Bachelor of Science degree or equivalent

Course Content: Theoretical principles underlying the design and operation of control instruments. Analysis of stimulus-response relations. Industrial instruments for measurement and control, including those based on pneumatic, hydraulic, and electrical mechanisms.

G4.502   *Industrial Process Control*   (Offered in 1954-55)

Preparation: Bachelor of Science degree or equivalent

Course Content: Fundamental principles involved in instrument control of industrial processes. Economic considerations. Application of control instruments to obtain automatic control of temperature, pressure, fluid flow, liquid level, humidity and pH.

G4.601
G4.602   *Chemical Engineering Kinetics*

Preparation: Undergraduate work in Physical Chemistry and Thermodynamics

Course Content: Principles of chemical kinetics including the fundamentals of the Arrhenius Theory of molecular collisions and energy distribution as well as the theory of absolute reaction rates. Homogeneous and heterogeneous reactions of industrial importance will be analyzed from laboratory data to design commercial reactors. Related topics of heat and mass transfer will be included in the reactor design problems.

G4.611
G4.612   *High-Polymer Theory and Practice*   (Offered in 1954-55)

Preparation: Basic preparation in undergraduate Organic Chemistry or its equivalent

Course Content: The principles of high-polymer chemistry and engineering, and their use in the preparation of industrially important polymers. The manufacture and properties of fibers, plastics, and rubbers and their applications will be discussed. Both synthetic and naturally occurring polymers will be included. Emphasis will be placed on demonstrating how scientific principles are translated into practice.

G4.810 Chemical Engineering Plant Design   (Offered in 1954-55)

Preparation: Bachelor of Science in Chemical Engineering

Course Content: Principles of chemical engineering plant design will be considered with particular emphasis on plant location, heat, material and time balances, materials of construction, scale-up of pilot data, equipment and manufacturing cost estimating, and plant layout. Application of the principles to actual commercial problems will be stressed.

G4.820 Economics and the Chemical Industry   (Offered in 1954-55)

Preparation: Bachelor of Science in Chemical Engineering

Course Content: Lectures directed toward giving the student a clear picture of the broad economic characteristics of the chemical industry: raw materials and major products, business structure, competition, financial analysis of leading companies, labor problems, distribution and selling, budgeting and pricing.

G4.951
G4.952 Topics in Chemical Engineering

Preparation: Consent of the instructor

Course Content: Various topics of recent interest in chemical engineering. The subject matter will vary from year to year.

Chemistry

As one of the fundamental sciences, chemistry has played and continues to play a vital role in many branches of technology. Many of the complex problems facing the present scientist and engineer have their solution in terms of chemical concepts. The graduate courses in chemistry are designed to give training in the theoretical and practical aspects of the various fields of chemistry.

G11.111
G11.112 Advanced Inorganic Chemistry   (Offered in 1954-55)

Preparation: A year course in Physical Chemistry and an undergraduate course in Advanced Inorganic Chemistry, or its equivalent.

Course Content: A study of the elements and the more important classes of compounds from the standpoint of the periodic table. Typical properties and reactions are examined in terms of electronic structures. Consideration is given to theories of valence as applied to inorganic compounds.

G11.235
G11.236 Advanced Organic Chemistry   (Offered in 1954-55)

Preparation: Two years of undergraduate Organic Chemistry or its equivalent

Course Content: Lectures on selected topics in organic chemistry. Mechanisms of organic reactions, bond types, resonance, displacement reactions, co-ordination compounds, molecular rearrangements. Mechanisms of organic reactions continued. Carbonyl compounds, alicyclic compounds and strain theory, polymerization, reactions of olefinic compounds, catalytic cracking.

G11.240   *Mechanism of Organic Reactions*   (Offered in 1954-55)

Preparation: Two years of undergraduate Organic Chemistry or its equivalent

Course Content: Consideration of the fundamental factors influencing the course of a chemical reaction. Study of the effects of structural environmental changes on mechanisms of organic reactions.

G11.244   *Biochemistry*

Preparation: A year course of undergraduate Organic Chemistry or its equivalent.

Course Content: A survey of biochemistry and application of biochemical concepts in nutrition; chemistry and intermediary metabolism of carbohydrates, fats, and proteins.

G11.331   *Advanced Physical Chemistry*   (Offered in 1954-55)

Preparation: A year course in Physical Chemistry or its equivalent

Course Content: Lectures on selected topics in physical chemistry. First and second laws of thermodynamics; chemical equilibrium; kinetic theory; atomic structure and spectra; radioactivity.

G11.332   *Advanced Physical Chemistry*   (Offered in 1954-55)

Preparation: G11.331 Advanced Physical Chemistry or its equivalent

Course Content: Lectures on selected topics in physical chemistry. Wave mechanics; molecular structure; chemical statistics; liquids and solids; surface chemistry; electrochemistry.

G11.333   *Photochemistry*   (Offered in 1954-55)

Preparation: A year course in Physical Chemistry or its equivalent.

Course Content: A detailed discussion will be given to the mechanisms of representative reactions which can be initiated by light.

G11.336   *Reaction Kinetics*   (Offered in 1954-55)

Preparation: A year course in Physical Chemistry or its equivalent

Course Content: Introduction to the kinetic theory of gases; collision frequencies; homogeneous and heterogeneous reactions in gaseous and liquid systems.

G11.340   *Nuclear Chemistry*   (Offered in 1954-55)

Preparation: A year course in Physical Chemistry

Course Content: Nuclear composition, study of isotopes and their separations, natural and artificial radioactivity, nuclear reactions and decay.

G11.412   *Theory of Optical Methods of Chemical Analysis*   (Offered in 1954-55)

Preparation: An undergraduate course in Quantitative Analysis and a course in Physical Chemistry or its equivalent

Course Content: Theory of optical methods of obtaining quantitative information. Emission and absorption spectroscopy, spectrophotometry, colorimeter, microscopy, and refractometry.

G11.413   Theory of Electrochemical Methods of Analysis   (Offered in 1954-55)

Preparation: An undergraduate course in Quantitative Analysis and a course in Physical Chemistry or its equivalent.

Course Content: Theory of electrochemical methods of obtaining quantitative information. Potentiometry, conductivity, polarography amperometry, coulometry, and oscillometry.

G11.951
G11.952   Topics in Chemistry

Preparation: Consent of the instructor

Course Content: Various topics of recent interest in chemistry. The subject matter will vary from year to year.

Mathematics

The study of advanced engineering mathematics presupposes a background in mathematics through the elementary theory of ordinary differential equations, devoted to the study of the standard methods of manipulating the common types of ordinary differential equations. The treatment of advanced mathematics for engineering students should be in accord with the fundamental fact that it is to be useful to the engineer, either in direct application or as training in analytical thinking. However, in view of the recent great impetus given to the application of abstract mathematical techniques to the solution of technical problems, it is difficult to establish the criteria and bounds of usefulness. It might even be stated that there is no branch of mathematics so abstruse that it cannot be put to some use in solving some particular engineering problem.

G14.50   Elementary Differential Equations   (Offered in 1954-55)

Preparation: Differential and Integral Calculus

Course Content: This course is designed especially to fit the needs of those students who intend to pursue graduate work in the Graduate Division but whose undergraduate mathematical background is weak either because they did not have differential equations as undergraduates or because they have been away from formal mathematical work for some time. (This two (2) semester hour course may be required of certain graduate students; however, it cannot be used in fulfilling the credit requirements for the master's degree.)

G14.101   Advanced Mathematics   (Offered in 1954-55)

Preparation: Differential Equations

Course Content: Linear ordinary differential equations: linear operators, simultaneous equations, variation of parameters, hyperbolic functions. The Laplace transformation: the inverse transform, convolution, applications, gamma functions. Series solutions of differential equations: power series, method of Frobenius, Bessel functions, Legendre functions.

G14.102   Advanced Mathematics   (Offered in 1954-55)

Preparation: G14.101 Advanced Mathematics

Course Content: Boundary value problems and orthogonal functions: orthogonality, characteristic functions, expansion theorem, Fourier series, Fourier-Bessel series, Legendre series. Vector analysis: algebra of vectors, calculus of

vectors, line and surface integrals. Partial differential equations: partial differentiation, linear equations of second order. Solution of partial differential equations of mathematical physics: heat flow, temperature distribution, fluid flow, vibration.

G14.105   Application of Mathematics to Engineering Problems
Preparation: G14.102 Advanced Mathematics
Course Content: Dynamics, the gyroscope, the ballistic problem, the motion of an airplane. Small oscillations. The mechanics of strings; the suspension bridge, the vibration and buckling of beams.

G14.200   Numerical and Graphical Methods for Engineers   (Offered in 1954-55)
Preparation: Differential and Integral Calculus
Course Content: Numerical solution of equations, empirical formulas and curve fitting, least squares, nomographs, graphical methods, interpolation.

G14.203   Nomography
Preparation: Differential and Integral Calculus
Course Content: An exposition of the principles and techniques employed in the design and construction of charts for the graphical solution of equations, especially alignment charts.

G14.204   Finite Differences   (Offered in 1954-55)
Preparation: Differential Equations
Course Content: Fundamental theory, difference forms; symbols of operation, interpolation formulas, finite integration; applications.

G14.205   Difference Equations
Preparation: G14.102 Advanced Mathematics or equivalent
Course Content: Formulation and solution of difference equations; approximate solution of engineering problems by finite-difference methods; relaxation techniques; stability and convergence of approximate methods. Applications to elastic systems, electrical networks, filters, potential theory, wave propagation, heat flow, etc.

G14.207   Modern Calculational Methods
Preparation: G14.102 Advanced Mathematics
Course Content: A study of various basic mathematical techniques for the numerical analysis of problems in engineering and physics by means of high-speed computing machines. Approximations, interpolation, finite differences, difference equations; relaxation methods.

G14.210   Theory of Equations
Preparation: Differential and Integral Calculus
Course Content: Solutions of the cubic and quartic equations, general theorems on the root of equations, symmetric functions, isolation of the real roots of equations, various approximate solutions of numerical equations, application of determinants to systems of equations.

G14.220 Statistics for Engineers (Offered in 1954-55)

Preparation: Differential and Integral Calculus

Course Content: Fundamental statistical methods, large-sample theory, tests of significance. Simple correlation and linear regression, introduction to analysis of variance and small-sample methods. Application to quality control and other engineering problems.

G14.221 Mathematical Statistics

Preparation: G14.102 Advanced Mathematics or equivalent

Course Content: The fundamental principles of statistics from the point of view of random variables and probability laws. This course covers many of the same topics as G14.220, but with more emphasis on mathematical derivations. Moment-generating and characteristic functions, multivariate distributions, derivation of certain sampling distributions.

G14.224 Experimental Statistics (Offered in 1954-55)

Preparation: G14.221 Mathematical Statistics or G14.220 Statistics for Engineers

Course Content: Randomized blocks, factorial designs, Latin squares, and other topics in Design of Experiments. Goodness of fit tests, 2 x 2 tables, correlation methods, applications to engineering problems.

G14.230 Probability (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics or equivalent

Course Content: Permutations and combinations; addition and multiplication theorems; discrete and continuous probability distributions, including binomial, Poisson and Normal; Bernoulli's theorem; Bayes' theorem; engineering applications.

G14.240 Matrix Theory (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics or equivalent

Course Content: Linear transformations, linear equations, matrices and bilinear forms, quadratic and Hermitian forms. The characteristic value problem and diagonalization of matrices. Applications to physical problems.

G14.241 Modern Algebra

Preparation: G14.102 Advanced Mathematics

Course Content: Introduction to the general algebraic properties of groups, rings, ideals, fields, and algebras.

G14.245 Group Theory and Applications

Preparation: G14.102 Advanced Mathematics

Course Content: Topics selected from the theories of finite groups, topological groups, group representations. Applications to physical problems in quantum theory, crystallography, and molecular spectra.

G14.300   Fourier Series and Boundary Value Problems   (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics or equivalent

Course Content: A problem course dealing with the application of trigonometric series and integrals and related forms to differential equations and boundary value problems.

G14.310   Vector Analysis   (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics or equivalent

Course Content: The theory and method of vector analysis as applied in physics and applied mathematics.

G14.320   Functions of a Complex Variable   (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics or equivalent

Course Content: The general theory of functions of a complex variable, Cauchy's theorem, Taylor's and Laurent's series, the theory of residues, conformal mapping, the Schwartz-Christoffel transformation.

G14.323   Theory of Functions of a Real Variable

Preparation: G14.102 Advanced Mathematics

Course Content: The real number system, bounds and limits of sequences, continuous functions, a critical study of differentiation and integration, existence theorems.

G14.330   Modern Operational Methods   (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics or equivalent

Course Content: Ordinary and partial differential operators; the Laplace transformation: properties of transforms, application to engineering problems; review of functions of a complex variable, the inversion integral, application to boundary value problems. The finite Fourier transformation.

G14.340   Calculus of Variations.   (Offered in 1954-55)

Preparation: Theory of Functions or consent of the instructor

Course Content: The minima of simple integrals in non-parametric form in three-space. Necessary and sufficient conditions for a minimum, fields, the Hamilton-Jacobi theory.

G14.510   Intermediate Differential Equations   (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics or equivalent

Course Content: Special solvable non-linear equations, linear equations, transformations, and symbolic methods; solutions in series. Riccati's, Bessel's and Legendre's equations.

G14.530   Partial Differential Equations

Preparation: G14.102 Advanced Mathematics

Course Content: Types of equations which are widely used in engineering. The vibrating string, Laplace's equation, the flow of heat. Fourier series and integrals, Bessel and Legendre functions, orthogonal functions.

G14.540   Non-Linear Differential Equations
Preparation: Consent of the instructor
Course Content: The topological methods of Poincaré, the work of van der Pol. Oscillations, non-linear resonance, and other applications.

G14.550   Integral Equations
Preparation: Consent of the instructor
Course Content: Linear integral equations, eigen-value theory, relation to infinite systems and differential equations, applications in mechanics and physics.

G14.600   Differential Geometry   (Offered in 1954-55)
Preparation: G14.102 Advanced Mathematics or equivalent
Course Content: Differential properties of space curves, developable surfaces, curved surfaces, and systems of curves on surfaces.

G14.700   Topology
Preparation: Consent of the instructor
Course Content: Metric spaces; their decompositions and transformations. Various types of cycles and Betti groups in metric spaces. Spaces having local connectedness properties. Homotopy properties.

G14.901
G14.902   Topics in Mathematics
Preparation: Consent of the instructor
Course Content: Various topics of interest in present-day mathematics. The subject matter will vary from year to year.

Physics

Many engineering and scientific organizations now recognize the need for including in their technical staffs persons whose principal training is in the field of physics. In recent years physics has advanced tremendously, and many of the theoretical and abstract concepts of modern physics have already found their way into current engineering practice. The engineer or scientist who has a broad training in the principles and techniques of classical and modern physics will be able to cope more effectively with these engineering-physical problems when they arise.

G15.101
G15.102   Theoretical Physics   (Offered in 1954-55)
Preparation: G14.102 Advanced Mathematics or equivalent
Course Content: The basic methods and fundamental theories forming the classical foundation of physics. A mathematical formulation of these concepts, illustrated in application to standard fields of physics, such as mechanics, electromagnetic fields, thermodynamics, hydrodynamics, and, if time permits, the extension of these concepts to the more recent fields.

G15.103
G15.104   Engineering Physics

Preparation: Differential Equations and consent of instructor

Course Content: This course aims to investigate and to unify the various fields of classical physics and to show how these relate to engineering. The principles and fundamental laws are discussed and applied to basic problems in mechanics, thermodynamics, statistical mechanics, electromagnetic theory, hydrodynamics, and other fields if time permits.

G15.111
G15.112   Mathematical Physics

Preparation: G15.102 Theoretical Physics or equivalent

Course Content: The formulation and solution of some of the partial differential equations of physics. Special emphasis is given to orthonormal functions and their use in the solution of partial differential equations. Application of group theory to physical problems.

G15.200   Modern Physics   (Offered in 1954-55)

Preparation: Differential Equations

Course Content: A survey of the historical background of physics leading to the failure of classical physics around 1900. The development of modern physics. This course forms an introduction to relativity, quantum theory, and nuclear physics.

G15.211
G15.212   Introduction to Quantum Theory   (Offered in 1954-55)

Preparation: G15.200 Modern Physics or equivalent

Course Content: Postulational formulation of quantum mechanics. Application to some simple systems. Perturbation theory.

G15.213
G15.214   Quantum Mechanics

Preparation: G15.200 Modern Physics, G14.102 Advanced Mathematics

Course Content: A postulational formulation of quantum mechanics. The basic theory both in operator and matrix formulation. Application to spectroscopy, specific heats and, if time permits, to nuclear structure and forces. The course is planned to give an introduction to quantum statistical mechanics and lays the foundation for a study of the solid state. (3 Semester Hours credit each semester.)

G15.220   Introduction to Nuclear Physics   (Offered in 1954-55)

Preparation: G15.200 Modern Physics or equivalent

Course Content: Radioactivity, alpha, beta, and gamma ray spectra. Nuclear structure and nuclear forces. Interaction of charged particles, neutrons, and photons with matter. Detection and measurement of charged particles, neutrons, and photons. Nuclear reactions.

G15.222
G15.223   Advanced Nuclear Physics

Preparation: G14.102 Advanced Mathematics, G15.220 Introduction to Nuclear Physics (or equivalent)

Course Content: Historic outline of the development of nuclear physics. Detection and measurement of radiations. Particle accelerators. Scattering cross sections. The Born approximation. General laws of radioactive decay. Alpha, beta, and gamma rays; their spectra and interaction with matter. General properties of nuclei and theories of nuclear structure and composition. Nuclear forces and statistics. The general and formal theory of nuclear reactions. (3 Semester Hours credit each semester.)

G15.225   Physics of Semiconductors   (Offered in 1954-55)

Preparation: Differential Equations

Course Content: A study of the mechanisms of conduction in solids, excess electrons and holes as current carriers, n-type and p-type semiconductors, p-n junctions, rectifiers and transistors. Comparison of metals, insulators, and semiconductors from an introductory quantum viewpoint. Considerations of surface states, crystal growth, and the effect of imperfections in crystals.

G15.226   Transistor Physics   (Offered in 1954-55)

Preparation: G15.225 Physics of Semiconductors or its equivalent

Course Content: Studies of properties of semiconductors, resistivity, mobility and lifetimes of current carriers, Hall Effect, surface effects, traps, scattering, diffusion, structure of barrier layer, currents in barriers, rectifier and transistor theory. Basic theories of wave mechanics and statistical mechanics as applied to semiconductors. Photoelectric effect.

G15.231
G15.232   Solid State Physics   (Offered in 1954-55)

Preparation: Statistical Mechanics and Quantum Theory

Course Content: Review of statistical mechanics, thermodynamics and electromagnetic theory. Transmission of electromagnetic waves in solids. Thermal properties of solids. Formulation of the problems of the solid state and discussion of some of the modern theories of the solid state.

G15.233
G15.234   Theory of Solids   (Offered in 1954-55)

Preparation: G15.214 Introduction to Quantum Mechanics

Course Content: This course reviews certain aspects of thermodynamics and statistical mechanics for application to the theory of the solid state and develops the classical and modern theories of the solid state. The thermodynamics of diamagnetism, paramagnetism and ferromagnetism and an introduction to the theory of Weiss. Einstein and Debye theories of specific heats of solids. Optical properties of crystals and metals. Statistical mechanics of electrons. Fermi levels, Brillouin zones and modern theories of conduction. Application to semiconductors and transistors as time permits. (3 Semester Hours credit each semester)

G15.240   Applied Spectroscopy

Preparation: G15.200 Modern Physics

Course Content: A study of the means of producing spectra and the measurement of wave lengths. A study of the instruments and experimental techniques used in spectroscopy. Industrial application of optic infrared, and microwave spectroscopy.

G15.250   Theory of Spectra

Preparation: G15.200 Modern Physics, Differential Equations

Course Content: The origin and description of atomic and molecular spectra. The effect on spectra of magnetic and electric fields. Use of molecular symmetry in analyzing Raman and infrared spectra.

G15.315
G15.316   Theoretical Mechanics

Preparation: G14.102 Advanced Mathematics

Course Content: Statics and dynamics. Formulation of mechanics according to Newton, Lagrange, and Hamilton. Transformation theory. Application to particles and rigid bodies.

G15.400   Vibration and Sound

Preparation: Differential Equations

Course Content: A general introduction to the theory of vibration and sound for students of physics and engineering, emphasizing the methods of physics in the formulation and solution of vibratory problems.

G15.500   Electricity and Magnetism   (Offered in 1954-55)

Preparation: Differential Equations,   G14.102 Advanced Mathematics

Course Content: A discussion of the properties of the electromagnetic field as described by Maxwell's equations. Formulation of the fundamental problems and a discussion of their solution. The course develops the properties and use of special functions, such as Spherical Harmonics, Legendre Polynomials, Fourier Integrals, etc., as needed.

G15.503
G15.504   Electromagnetic Theory   (Offered in 1954-55)

Preparation: G14.102 Advanced Mathematics

Course Content: Classical theory of the electromagnetic field as described by Maxwell's equations. The static field and fields varying in time. Electromagnetic theory of light. (3 Semester Hours credit each semester)

G15.611   Physical Optics

Preparation: Differential Equations

Course Content: Elementary theory of diffraction, refraction, and polarization. An introduction to the electromagnetic theory of optics.

G15.621
G15.622　Advanced Optics

Preparation:　Electromagnetic Theory

Course Content:　Electromagnetic theory of optics. Reflection and refraction in crystals and metals. Diffraction theory and applications.

G15.710　Thermodynamics

Preparation:　G14.102 Advanced Mathematics

Course Content:　A discussion and development of the laws of thermodynamics. Characteristic functions and transformations from one set of variables to another. Introduction of electrical variables and thermo-electricity. Thermodynamic equilibrium and shift from equilibrium.

G15.720　Kinetic Theory and Statistical Mechanics　(Offered in 1954-55)

Preparation:　Thermodynamics, G14.102 Advanced Mathematics

Course Content:　Development of the thermodynamic laws from the point of view of kinetic theory and statistical mechanics. Discussion of Maxwell-Boltzmann, Fermi-Dirac, and Einstein-Bose statistics.

G15.741
G15.742　Chemical Physics

Preparation:　G14.102 Advanced Mathematics

Course Content:　An introduction to the borderline field between chemistry and physics, as exemplified in thermodynamics, kinetic theory, statistical mechanics, and spectroscopy. Simple systems. Mixtures of simple systems. Equilibrium, shift from equilibrium, and the Gibbs phase rule. Maxwell-Boltzmann, Einstein-Bose, Fermi-Dirac statistics. Atomic and molecular spectra.

G15.901
G15.902　Topics in Physics

Preparation:　Theoretical Physics

Course Content:　Various topics of interest in present-day physics. The subject matter will vary from year to year.

Communications

　　This curriculum, leading to the degree of Master of Science in Communications, has been prepared primarily to meet the needs of the physicist or mathematician working in the communications industry. While it is to be noted that the degree earned is not in engineering, the majority of the courses in the curriculum are necessarily chosen from the electrical engineering field; students holding a baccalaureate degree in engineering, in a field other than electrical, can, with permission, also become enrolled as degree candidates in the program.

　　This curriculum is under the joint supervision of the Departments of Electrical Engineering, Mathematics, and Physics. The graduate courses in the degree program are found listed under the course offerings of these three departments.

Courses Offered in 1954-55

FIRST SEMESTER

G 1.201	Sanitary Engineering
G 1.205a	Sanitary Analysis
G 1.213	Hydrology
G 1.401	Indeterminate Structures
G 1.403	Indeterminate Structures
G 1.503	Soil Mechanics
G 1.505	Soil Mechanics
G 1.601	Design of Structures
G 2.200	Advanced Mechanics of Materials
G 2.201	Theory of Elasticity
G 2.213	Advanced Dynamics
G 2.221	Fluid Mechanics
G 2.301	Heat Transfer
G 2.311	Advanced Thermodynamics
G 2.501	Power Plant Economics
G 2.601	Refrigeration
G 2.701	Metallography
G 2.800	Automatic Control Engineering
G 3.101	Servomechanisms
G 3.201	Pulse Circuits
G 3.204	Digital Computer Coding and Logic
G 3.211	High-Frequency Television Circuits
G 3.401	Transients in Linear Systems
G 3.402	Transients in Linear Systems
G 3.501	Communication Theory
G 3.505	Engineering Acoustics
G 3.605	Transistor Circuit Engineering
G 3.611	Advanced Alternating-Current Machinery
G 3.701	Electronic Engineering
G 3.801	Application of Microwaves
G 3.901	Electric Circuit Theory
G 3.911	Electric Power Circuits
G 4.501	Fundamentals of Instrumentation
G 4.611	High-Polymer Theory and Practice
G 4.810	Chemical Engineering Plant Design
G11.111	Advanced Inorganic Chemistry
G11.235	Advanced Organic Chemistry
G11.331	Advanced Physical Chemistry
G11.333	Photochemistry
G11.340	Nuclear Chemistry
G11.413	Theory of Electrochemical Methods of Analysis
G14.50	Elementary Differential Equations
G14.101	Advanced Mathematics
G14.102	Advanced Mathematics
G14.200	Numerical and Graphical Method for Engineers
G14.224	Experimental Statistics
G14.230	Probability
G14.240	Matrix Theory
G14.320	Functions of a Complex Variable
G14.330	Modern Operational Methods
G14.340	Calculus of Variations
G15.101	Theoretical Physics
G15.200	Modern Physics
G15.211	Introduction to Quantum Theory
G15.225	Physics of Semiconductors
G15.231	Solid State Physics
G15.233	Theory of Solids
G15.503	Electromagnetic Theory
G15.720	Kinetic Theory and Statistical Mechanics

Second Semester

G 1.202	Sanitary Engineering		G 3.915	Electric Power Distribution
G 1.205b	Sanitary Analysis		G 4.502	Industrial Process Control
G 1.214	Hydrology		G 4.612	High-Polymer Theory and Practice
G 1.402	Indeterminate Structures		G 4.820	Economics and the Chemical Industry
G 1.504	Soil Mechanics			
G 1.506	Soil Mechanics Laboratory		G11.112	Advanced Inorganic Chemistry
G 1.602	Design of Structures		G11.236	Advanced Organic Chemistry
G 1.605	Prestressed Concrete		G11.240	Mechanism of Organic Reactions
G 2.200	Advanced Mechanics of Materials		G11.332	Advanced Physical Chemistry
G 2.202	Theory of Elasticity		G11.336	Reaction Kinetics
G 2.214	Advanced Dynamics		G11.412	Theory of Optical Methods of Chemical Analysis
G 2.222	Fluid Mechanics			
G 2.230	Bearings and Lubrication		G14.50	Elementary Differential Equations
G 2.250	Advanced Machine Design		G14.101	Advanced Mathematics
G 2.302	Heat Transfer		G14.102	Advanced Mathematics
G 2.312	Advanced Thermodynamics		G14.204	Finite Differences
G 2.401	Pumps		G14.220	Statistics for Engineers
G 2.502	Power Plant Economics		G14.300	Fourier Series and Boundary Value Problems
G 2.702	Metallography			
G 3.102	Servomechanisms		G14.310	Vector Analysis
G 3.202	Pulse Circuits		G14.320	Functions of a Complex Variable
G 3.212	Low-Frequency Television Circuits		G14.510	Intermediate Differential Equations
G 3.215	Computing and Control Devices		G14.600	Differential Geometry
G 3.401	Transients in Linear Systems		G15.102	Theoretical Physics
G 3.402	Transients in Linear Systems		G15.200	Modern Physics
G 3.403	Transients in Linear Systems		G15.212	Introduction to Quantum Theory
G 3.502	Communication Theory			
G 3.606	Transistor Circuit Engineering		G15.220	Introduction to Nuclear Physics
G 3.612	Advanced Alternating-Current Machinery		G15.226	Transistor Physics
G 3.702	Electronic Engineering		G15.232	Solid State Physics
G 3.802	Application of Microwaves		G15.234	Theory of Solids
G 3.902	Electric Circuit Theory		G15.500	Electricity and Magnetism
G 3.912	Electric Power Circuits		G15.504	Electromagnetic Theory

The registration circulars issued in August and January provide details regarding class meeting times, room assignments, and teaching staff for the First Semester and Second Semester, respectively. Information concerning Summer Session offerings will be found in the Summer Session circular which is issued in May. Copies of this Bulletin and of the circulars may be obtained from the Office of the Graduate Division, College of Engineering, Northeastern University, Boston 15, Massachusetts, or by calling COpley 7-6600.

Date_____

Dean Herbert K. Brown
Graduate Division, College of Engineering
Northeastern University
Boston 15, Massachusetts

Dear Sir:

I wish to be placed on the mailing list so that I may receive the registration circulars of the Graduate Division of the College of Engineering. I am interested in the following courses which are being offered in 1954-1955:

	Course Number	*Course Title*

First Semester

1._____

2._____

3._____
  (Alternate)

Second Semester

1._____

2._____

3._____
  (Alternate)

Name_____
(Print)   First   Middle   Last

Home Address_____
          Street   City   Zone   State   Phone

Business Affiliation_____
                    Firm's Name

_____
Street   City   Zone   State   Phone   Ext

College Attended_____

Degree_____Date_____   *Please Check:*

☐ *Non-Vet*   ☐ *Vet-on-own*

☐ *P.L.-346*   ☐ *P.L.-550*

☐ *P.L.-16*

NORTHEASTERN UNIVERSITY
(*COEDUCATIONAL*)

Programs of instruction leading to appropriate degrees are offered by the Schools and Colleges of the University in the following areas of study:

LIBERAL ARTS

The **COLLEGE OF LIBERAL ARTS** offers a broad program of courses in the sciences, mathematics, modern languages, humanities, and social studies serving as a foundation for the understanding of modern culture, social relations, and technical achievement. Varied opportunities are available for specialization. Degrees: Bachelor of Arts; Bachelor of Science.

The **EVENING DIVISION** of the College offers courses in the fields of arts and social sciences during evening and Saturday morning hours. Degrees: Bachelor of Arts; Associate in Arts.

EDUCATION

The **COLLEGE OF EDUCATION** offers day curricula combining broad general education and professional study for the preparation of elementary and secondary school teachers. Degree: Bachelor of Science in Education.

The **GRADUATE DIVISION** of the College offers, during late afternoon, evening, and Saturday morning hours, advanced courses leading to the degree of Master of Education.

BUSINESS

The **COLLEGE OF BUSINESS ADMINISTRATION** offers curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management. Each curriculum represents in itself a broad survey of business technique, differing from the others chiefly in emphasis. Degree: Bachelor of Science in Business Administration.

The **SCHOOL OF BUSINESS,** organized specifically to meet through evening classes the needs of employed persons, offers curricula in Accounting, Business Management, Engineering and Management, Industrial Management, Insurance, Marketing, Law and Business, Personnel and Industrial Relations, Real Estate, Retailing, Public Administration, Transportation and Traffic Management. Degrees: Bachelor of Business Administration; Associate in Business Administration.

The **GRADUATE DIVISION** of the School provides an evening program of advanced study leading to the degree of Master of Business Administration.

ENGINEERING

The **COLLEGE OF ENGINEERING** offers professional curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. Degree: Bachelor of Science in Engineering with specification as to field.

The **GRADUATE DIVISION** of the College offers, during evening hours, advanced courses in certain fields of Civil, Mechanical, and Electrical Engineering, Chemistry, and Mathematics-Physics, leading to the degree of Master of Science.

The **LINCOLN INSTITUTE** offers four-year evening programs in the technology of various fields of engineering and in chemistry. The curricula comprise courses of college grade which are integrated into programs covering the several specialized fields. Degrees: Associate in Engineering; Associate in Chemistry.

The Co-operative Plan

The Colleges of Liberal Arts, Education, Business Administration, and Engineering offer day programs and are conducted on the Co-operative Plan. After the freshman year students alternate periods of study with periods of work in the employ of business or industrial concerns. Under this plan they gain valuable experience and earn a large part of their college expenses.

For further information regarding any of the above schools, address

Director of Admissions
NORTHEASTERN UNIVERSITY
BOSTON, MASSACHUSETTS

COpley 7-6600   360 HUNTINGTON AVENUE

NORTHEASTERN UNIVERSITY

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FOUNDED A.D. 1898

BOSTON, MASSACHUSETTS

Northeastern University

LVX
VERITAS
VIRTVS

CATALOG ISSUE
1954-1955

GRADUATE DIVISION

OF THE

SCHOOL OF BUSINESS

EVENING SESSIONS

OFFICE HOURS

Monday through Thursday . . . . .8:45 a.m.–9:00 p.m.
Friday. . . . . .8:45 a.m.–5:00 p.m.

August 15 — June 15

Monday through Friday. . . . . .8:45 a.m.–9:00 p.m.
Saturday. . . . . .8:45 a.m.–12:00 noon

The office is closed on all legal holidays.

Interviews

Prospective students, or those desiring advice or guidance regarding any part of the school work or curricula, are encouraged to arrange for personal interviews with the Director of Graduate Study or other officers of instruction.

Gifts and Bequests

Northeastern University will welcome gifts and bequests for the following purposes:

- (*a*) For its building program.
- (*b*) For general endowment.
- (*c*) For specific purposes which may especially appeal to the donor.

It is suggested that, when possible, those contemplating gifts or bequests confer with the President of the University regarding the University's needs before legal papers are drawn.

The legal name of the University is "Northeastern University." However, in the making of gifts and bequests to Northeastern, the following wording is suggested: "Northeastern University, an educational institution incorporated under the laws of Massachusetts and located in Boston, Massachusetts."

Address Communications to

NORTHEASTERN UNIVERSITY
Graduate Division
SCHOOL OF BUSINESS

360 HUNTINGTON AVENUE, BOSTON 15, MASS.
Telephone: COpley 7-6600

NORTHEASTERN UNIVERSITY
GRADUATE DIVISION
SCHOOL OF BUSINESS

CATALOG OF

EVENING GRADUATE COURSES

Leading to the Degree of Master of Business Administration

COURSES DESIGNED
FOR THE
PROFESSIONAL DEVELOPMENT OF EMPLOYED PERSONS
IN BUSINESS

Instructional Calendar

1954

Summer session classes begin	June 1
Legal Holiday—No class sessions . . .	July 4
Summer session classes end	September 2
First semester classes begin	September 20
Legal Holiday—No class sessions . . .	October 12
Week for first term tests	October 25-30
Legal Holiday—No class sessions . . .	November 11
Legal Holiday—No class sessions . . .	November 25
Week for second term tests	December6-11
Final class session before Christmas recess . .	December 21

1955

First class session after Christmas recess . .	January 3
Final Examinations, first semester . . .	January 24-29
Second semester classes begin	January 31
Legal Holiday—No class sessions . . .	February 22
Week of first term tests	March 7-12
Legal Holiday—No class sessions . . .	April 19
Week of second term tests	April 18-23
Legal Holiday—No class sessions . . .	May 30
Final Examinations, second semester . . .	May 23-28
Summer Term begins	May 31
Commencement	June 17
Summer Term ends	September 1

Those desiring to enroll for courses offered during the fall semester should file applications with the Director of Graduate Study not later than September 1. All applications for admission, inquiries regarding eligibility, and details of courses offered should be addressed to the

Director of Graduate Study

SCHOOL OF BUSINESS — NORTHEASTERN UNIVERSITY
360 Huntington Avenue, Boston, Massachusetts

COpley 7-6600 — Extension 261

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Northeastern University

General University Committees

Executive Council

Carl Stephens Ell, *Chairman*
William Crombie White, *Vice-Chairman*

Lincoln Carr Bateson
Albert Ellsworth Everett

Edward Snow Parsons
Milton John Schlagenhauf

University Cabinet

Carl Stephens Ell, *Chairman*
William Crombie White, *Vice-Chairman*

William Thurlow Alexander
Lincoln Carr Bateson
Herbert Kapfel Brown
Joseph Gerard Crane
Albert Ellsworth Everett
George Raymond Fennell
Gilbert Clayton Garland
Roger Stanton Hamilton
Charles William Havice
Frederick Robert Henderson
Wilfred Stanley Lake

Donald Hershey MacKenzie
George Arthur Mallion
Harold Wesley Melvin
Roland Herbert Moody
Rudolph Magnus Morris
Rudolf Oscar Oberg
Edward Snow Parsons
Milton John Schlagenhauf
George Speers
J. Kenneth Stevenson
Lester S. Vander Werf

Roy L. Wooldridge

Library Committee

William Crombie White, *Chairman*

William Thurlow Alexander
Albert Ellsworth Everett
Roger Stanton Hamilton

Wilfred Stanley Lake
Harold Wesley Melvin
Roland H. Moody

William Bird Van Lennep

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School of Business

Administrative Organization

General Officers of Administration
Carl Stephens Ell, A.B., M.S., Ed.M., Sc.D., *President of the University*
William Crombie White, S.B., Ed.M., Eng.D., *Vice-President of the University*
Albert Ellsworth Everett, S.B., M.B.A., *Director of the Evening Division*

Officers of the School of Business
Albert Ellsworth Everett, S.B., M.B.A., *Dean*
George Arthur Mallion, B.Ch.E., *Assistant Dean*
William Mitchell Stewart, B.S., *Registrar*
Vincent P. Wright, B.S., M.A., *Director of Graduate Study*
Milton John Schlagenhauf, A.B., B.D., M.A., *Director of Public Relations*
John E. Sullivan, A.B., Ed.M., *Director, Bureau of Business and Industrial Training*
Gurth I. Abercrombie, B.S., *Placement Officer*
Daniel J. Roberts, B.S., Ed.M., *Director of Veterans' and Students' Accounts*
Paul R. Spinney, *Director of Veterans' Services*
J. Kenneth Stevenson, B.C.S., *Supervisor of Buildings and Grounds*
Rudolf Oscar Oberg, S.B., Ed.M., *Director of Alumni Relations*
Daisy Milne Everett, *Bursar*

Administrative Committee
Albert Ellsworth Everett, *Chairman*

Frank M. Cushman	Stanley O. Robinson
Howard F. Greene	Bernard H. Shelton
George A. Mallion	Benjamin F. Stacey
A. Howard Myers	William M. Stewart
Franklin Norvish	John E. Sullivan
Harry Olins	Mark Wainer

Vincent P. Wright

Office Administration
William Mitchell Stewart, *Registrar*
Donald R. Webber, *Assistant to the Registrar*
Pauline M. Hovsepian, *Secretary to the Dean*

Elizabeth H. Bryant, *Clerk-Typist*	Marie L. Marsh, *Secretary*
Nancy Coleman, *Secretary*	Edith Melvin, *Recorder*
Anna C. Gray, *Secretary*	Grace E. Myshrall, *Clerk-Typist*
Joyce E. Lyons, *Secretary*	Elizabeth R. Vecchiolla, *Secretary*

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Northeastern University

The Graduate School of Business

THE OBJECTIVE of the Graduate School of Business is to provide an opportunity for men and women to develop themselves for positions of responsibility in the business community. The faculty believes in the value of graduate study in business for employed students. Experience has shown that high standards of performance can be effectively maintained by such students whose backgrounds stimulate and promote interest, appreciation, and understanding of advanced courses of instruction.

Business Administration in a complex economy requires the interrelationship of many specialized areas. The function of the administrator is largely one of coordinating through effective policy the contributions of many specialized skills.

In developing the graduate program, the Committee on Graduate Study has incorporated the thoughts expressed by successful business executives as to what is most effective in the development of those who assume managerial responsibilities. To accomplish these objectives, the faculty is composed of men of professional competence who have had extensive experience in business and industry and who are capable of imparting both the proximate and the remote aspects of the relevant concept in administrative policy.

In contrast to narrow specialization in a specific area, the graduate program offered in the School of Business aims at scope or breadth of understanding. The core courses which are required of all students cut across the several major areas of operation with which the executive must deal on the policy level, including advanced consideration of the varied problems in organization, production, distribution, finance, labor relations, etc. Through the elective courses and the thesis, the student is provided an opportunity to pursue his major interest as well as secure an understanding of the forces influencing our economy.

All of the evening graduate courses outlined in the catalog are open to men and women who already hold a bachelor's degree and who are qualified to profit from the instruction, whether they desire to enroll as candidates for the degree or plan to register as "special students" enrolled in one or more courses.

The Graduate Program in the School of Business operates under the general policies established by the Faculty Committee on Graduate Study. This Committee is comprised of the heads of the instructional departments, the Dean of the School of Business, and the Director of the Graduate Study Program.

Graduate School of Business

General Administrative Policy

Requirements for Admission

All of the evening graduate courses outlined in the catalog are open to men and women who already hold a recognized bachelor's degree and who are qualified to profit from the instruction. Admission to the Graduate School of Business will be based upon conclusive evidence of the applicant's fitness for the work offered by the School and its potential professional value to him. In addition to previous scholastic record, selection also will consider current employment and achievement, the range and definiteness of professional interests, integrity and sense of responsibility, as well as indications of the applicant's ability to command the respect and confidence of his associates and employers.

Applicants for admission to the Graduate School of Business will be considered under two classifications.

1. *Candidates for the Master's Degree in Business Administration:* Graduates of colleges, universities, or technical schools, whose credentials indicate a satisfactory quality of undergraduate achievement and whose personal qualifications and records give evidence of ability to profit by the program of study, will be accepted for admission. The degree candidate must file with the Director of Graduate Study official transcripts of record of undergraduate work completed, and three letters of recommendation, one of which shall be from a responsible officer in the college in which he completed his undergraduate work, preferably the head of the department in which his degree was taken; one from his employer; and a third of his own choice.

The records of all applicants will be reviewed by the Board of Admissions and approval will be based upon the quality and general preparation evidenced. The Board may require additional preparation where the applicant's background, while of acceptable quality, may not appear to be adequate in certain respects.

Students who wish their graduate work to apply toward a degree of Master of Business Administration must register under this classification and each student's program of study must be approved before the applicant can be considered a degree candidate. Courses taken before the program is approved and filed are taken on the student's own responsibility.

2. *Special Students:* Two classes of special students will be admitted, i.e.:

(*a*) Students who could satisfy the admission requirements of a degree candidate as previously outlined, but who for personal reasons wish to enroll for special courses which would prove helpful to them professionally. Such students need only supply evidence of an undergraduate degree. Special students in either class (*a*) or (*b*) are subject to the same regulations covering attendance and quality of work, and must satisfy all course requirements for a grade. However, they will not receive degree credit. Should such students later desire to become degree candidates, their work completed would be evaluated in terms of program requirements for the degree. The School assumes no responsibility for accrediting such courses toward a degree.

(b) Mature persons who although not possessing a bachelor's degree have evidenced by superior achievement in their respective business pursuits that they could carry and profit by the work may be admitted for certain courses of study by permission of the Dean. The Committee on Admissions will outline special procedures whereby the applicant may present credentials to establish his qualifications. A special student in classification (b) will not receive credit toward an advanced degree until he has satisfied all of the requirements for admission as a regular candidate for the master's degree as outlined under (1) above.

Requirements for the Degree

It is recognized that the requirements of degree candidates will vary with their respective undergraduate preparation.

1. *Undergraduate Course Prerequisites:* The program for the M.B.A. degree is based upon an undergraduate background in business, commerce, and economics. It is understood that not all degree candidates will have completed the required undergraduate work in the specified areas. Consequently the following foundation areas of undergraduate work have been established:

Accounting	Business Law	Marketing
Business Economics	Labor Relations	Production
Business Finance		Statistics

The graduate program may be undertaken only upon specific understanding between the student and his faculty adviser as to the schedule of completion of the above undergraduate requirements. Under special conditions a candidate who has not taken one or more of the above prerequisites in undergraduate study may request exemption on the basis of unusual work experience in the fields. In such cases the student may petition for the privilege of demonstrating his knowledge through a proficiency examination.

2. *Graduate Course Requirements:*

(a) *Course Requirements:* The program of courses for each degree candidate is arranged through consultation with his faculty adviser. In general, and over and above any undergraduate course prerequisite mentioned in (1) above, it will comprise thirty (30) semester hours of credit earned in courses approved for graduate credit, plus a thesis equivalent to five (5) semester hours credit completed in G 298-299, Thesis Seminar. The thirty (30) semester hours of credit will comprise a core of required graduate courses prescribed by the faculty adviser, plus electives to complete the credit requirements.

To allow adequate time for outside preparation, the student is permitted to enroll in any term for but two (2) evenings of instruction per week, with the exception that G 298-299, Thesis Seminar, may be taken concurrently with other courses of either classification upon approval of his faculty adviser.

(b) *English Proficiency:* The Faculty Committee on Curricula has established the policy that every student must meet the School's requirement for proficiency in English. An English Proficiency Examination will be administered during the first week of each semester. Considerable latitude is granted the student for meeting such requirement. However, no student will be permitted to start his thesis formally until he has satisfied this requirement. Those who demonstrate a need for further instruction must enroll in the course, "Effective Communications."

(c) *Thesis Requirements:* Each degree candidate must submit a written report embodying the results of an independent study on some important subject in the field of his major interest. This report will be prepared in a seminar course for which the student will register upon approval of his faculty adviser. All theses must be completed and submitted to the seminar instructor prior to May 1 of the academic year.

(d) *Comprehensive Examination:* A comprehensive oral examination shall be required of each student as part of the academic accomplishment toward the M.B.A. degree. The examination will be in the field of the student's thesis and will be given only after the thesis is submitted to the Director of the Graduate Program. A committee of no less than three and no more than five of the faculty will participate in the examination.

General Requirements for Graduation

1. *Scholastic Achievement:* The cumulative academic average of all courses taken by a student for degree credit must be B or better, with no grade below C in any single course. All foundation courses must be completed with grades of B or better. Graduate credit for courses in the 100-199 classification will be allowed only upon prior approval of the faculty adviser.

A student who fails three semester courses (e.g. three $2\frac{1}{2}$ semester hour courses) will be required to discontinue graduate work.

Graduate examinations must be taken at the assigned time. Deferments are granted by the Director of the Graduate Division only to those who have substantial reasons. There are no make-up examinations in any Graduate School course.

Any candidate for a Master's degree who accumulates two "Incomplete" grades and fails to make arrangements before the end of the following semester to clear these deficiencies not later than the following academic year shall be removed from his status as a degree candidate.

2. *Course Load:* Any student registered in the Graduate School of Business for graduate courses (either classification 100-199 or 200-299 courses) will be limited to registration in two courses per week.

3. *Residence Requirement:* Degree candidates must complete in the Graduate School of Business a minimum of 20 semester hours of credit next preceding graduation.

4. *Time Limit:* It is expected that study will be continuous on either a partial or full program until completion of the degree requirements. Students who for practical reasons encounter problems necessitating temporary discontinuance must arrange with the Director for a special privilege arrangement.

Examinations

Final examinations, which are required for all students, are scheduled for the end of each term. Credit is not allowed for any course until the examination has been passed successfully.

In the case where a student is unable to take the examinations as originally scheduled because of illness or business obligations beyond his control, he may petition for the privilege of taking his examination during the next regularly scheduled deferred examination period. The grade received will be recorded as the "original." The charge for each deferred examination is $5.00.

Graduate School of Business

Tuition and Fees

The policies governing the amount and the regulations pertaining to the payment of fees are established by the Executive Council of the University. The Council reserves the right to change these regulations at any time. Such changes will apply to students currently enrolled as well as new applicants for admission.

Checks should be drawn payable to: "Northeastern University."

Students are not permitted to attend class sessions or take any examinations or tests until they have paid their tuition fees or have made satisfactory arrangements for payments.

Students will not be advanced in class standing, or permitted to re-enroll in the University, nor will degrees be conferred until all financial obligations to the University have been met.

No certificate of honorable dismissal will be issued to any student who has not fully met his financial obligations to the University.

Matriculation Fee: The University matriculation fee of $10.00 must accompany the initial application for admission to the Graduate School of Business. This fee is non-refundable. Applicants who are graduates of one of the schools of Northeastern University are not subject to this fee.

Late Registration Fee: Students are required to register before the beginning of each term within periods specified by the Director of the Graduate Program. A student who fails to complete registration within the designated period may register at a later date with the approval of the Director and upon payment of a late registration fee of $5.00.

Tuition: The charge for tuition is at the rate of $16 per semester hour, or $40 per half year course. Tuition statements will be mailed to the students by the Student Accounts Office and are payable on or before the date specified.

Tuition for degree candidates for all courses is charged on the semester basis payable at the beginning of each semester. As a convenience, however, and unless otherwise requested, the tuition each semester is payable in two (2) installments; the second installment is payable on November 15 and March 15 in the first and second semesters respectively.

Tuition for an unclassified student registered in a special course is charged for the entire course and is payable in a single payment at the beginning of the course unless otherwise arranged.

Occasionally situations develop — usually beyond the control of the student — which make it difficult to meet the payments in the manner outlined above. Under such circumstances the student is advised to discuss his problem personally with the Student Accounts Office where a deferred payment agreement or a budget plan may be worked out. All budget plans carry a non-refundable service charge of $2.00. Such arrangements should be made before the end of the first week of the semester or within one week of the date of registration if the student enters late. Failure to take immediate action will result in a late payment fee.

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Tuition Underwritten by Employers: An increasing number of companies are underwriting in part or whole the cost of tuition of students in their employ. In such cases the student must furnish at the time of registration, or immediately thereafter, a purchase order covering his registration or a statement from an officer of his company certifying that the company is underwriting the tuition.

Late Payment Fee: A late payment fee of $2.00 is charged a student who fails to pay his tuition fee or other charges on or before the date specified by the University.

Deferred Examination Fee: Each deferred examination must be specially prepared and administered. To defray this expense the charges for the make-up privilege are as follows:

Tests (other than final examination).................... $3.00
Final Examinations................................... 5.00

Comprehensive Examination Fee: A fee of $10 is charged a student for the comprehensive examination in the field of his thesis.

Graduation Fee: The University graduation fee of $20 is charged to those who are candidates for the Master of Business Administration degree, and is payable on or before May 1st of the year in which the student expects to graduate.

Refund of Tuition

Requests for refunds must be made at the time of filing the Application for Withdrawal at the School Office. If the withdrawal notification is sent in by mail, the refund should be requested in the letter with reasons which necessitate the withdrawal. *No refunds will be granted a student who voluntarily withdraws* or who has attended more than five weeks of the term for which payment has been made.

Refunds of tuition will be considered only in the following instances:

1. If, because of illness, a student is compelled to withdraw before the fifth week of the term, or
2. If a student who is regularly employed is sent out of town permanently by his employer, or
3. If the hours of employment of a student who is regularly employed are changed so as to make it impossible for him to continue in attendance, or
4. If a student is inducted into military service.

The Committee on Withdrawals will consider requests for tuition refunds only on the following bases:

1. That the application for withdrawal be made immediately after the student ceases attendance.
2. The request for refund is accompanied by an *acceptable* physician's certificate in the instance of illness, or by an *acceptable* employer's certification in the instance of a change in place or hours of employment.
3. Evidence of induction into military service.

For cases complying with the above, partial refunds on tuition for the semester may be allowed according to the following schedule:

	Refund to Student on	
Petition for Withdrawal Filed Within	Regular Term	Summer Term
One Week	80 per cent	80 per cent
Two Weeks	80 per cent	60 per cent
Three Weeks	60 per cent	40 per cent
Four Weeks	40 per cent	20 per cent
Five Weeks	20 per cent	0 per cent
After Five Weeks	0 per cent	0 per cent

The above does not include fixed or non-refundable fees for which there is no refund allowed.

The official "Application for Withdrawal" form may be obtained in the School Office. All refunds are made through the Student Accounts Office of the University. The refund procedure in such cases takes from three to four weeks. A check is mailed directly to the student for any refund which may be granted.

Veterans

A veteran who wishes to attend under the educational benefits of Public Laws 346 or 550 (G. I. Bill of Rights) must report to the Veterans Office at Northeastern University at the time of registering to present his Certificate of Eligibility and Entitlement, or otherwise clear his status, and process the necessary forms. The acceptance of any applicant under the G. I. Bill is subject to a statement from the Northeastern University Veterans Office certifying to his eligibility.

Veterans currently enrolled in undergraduate degree programs are advised that they must procure Supplementary Certificates of Eligibility to continue study in the graduate field. Applications for said Certificates of Eligibility must be filed with the Veterans Administration no later than thirty (30) days after the final class sessions of undergraduate study.

Applicants for Certificates of Eligibility will find that the Veterans Office at Northeastern University is very willing to assist them in the processing of their applications. Due to certain technicalities in the law, the applicants are advised to make use of this service.

Graduate School of Business

Course Descriptions

T HE UNIVERSITY reserves the right to withdraw, modify or add to the courses offered, or to change the order of courses in curricula as may seem advisable.

The University further reserves the right to withdraw in any year any elective or special course for which less than twelve enrollments have been received. Regular students so affected by such withdrawal will be permitted to choose some other course. In the case of special students, a full refund of all tuition and other fees will be made.

The University also reserves the right to change the requirements for graduation, tuition and fees charged, and other regulations. However, no change in tuition and fees at any time shall become effective until the school year following that in which it is announced.

All full-year courses are numbered with a double consecutive number and all half-year courses with a single number. The letter or letters immediately preceding the numbers indicate the classification of the course. The number of class sessions indicated for each course includes the final examination session. All full-year courses will have mid-year examinations and course credit will be granted on a semester basis.

Courses offered for graduate credit are designated in the following descriptions under two classifications:

200–299 Courses open only to students registered in the Graduate School. A minimum of 20 semester hours of credit in this classification is required of all degree candidates.

100–199 Courses open to undergraduate and graduate students. Graduate students may register for credit in such courses only upon approval of the faculty adviser, and to a maximum limit of 10 semester hours of credit.

G 200 COMPARATIVE ECONOMIC SYSTEMS

This course attempts to bring into focus the various schools of economic thought as they might relate to our current economy. It presents an examination of the evolution of economic thinking in terms of the "climate" or environment out of which each developed, placing major emphasis on our modern economic concepts directly affecting the production and distribution of economic goods; the increasing important relationship of governmental policy to industrial activity; etc.

2½ semester hours credit

G 202 CASE STUDIES IN BUSINESS ENTERPRISE

A survey of the history of industrial endeavor and business activity from its rudimentary stages to the present day, with careful attention to the

evolution of business management, noting successful and unsuccessful examples by case history; discussion of the role that business plays in shaping our economy and society as well as the effect of our social and economic order upon the business firm; special emphasis is given to the control of business by the state, monetary policies, public finance, the rise of banks, corporations, commodity and stock exchanges, and their regulation and control; the rise, causes, and effects of financial and commercial crises and depressions; a close tie-in of the economic thinking that prevailed behind the visible aspects of economic and industrial activity.

2½ semester hours credit

G 204 GOVERNMENT AND BUSINESS

The expanding scope of the government's economic and social activities is bringing about a much closer relationship between government and business. The course analyzes the role of government as a regulating force as well as the nature and impact of governmental fiscal, economic, and social policies upon the conduct of business. The political and economic philosophies behind greater government participation in the economic structure of the nation, as indicated by public utility, anti-trust, and labor and social legislation; the responsibilities accruing to government as the result of its participation in the regulation and shaping of our economic endeavor, i.e., high level production, stabilized employment and worker's income, housing, foreign policy, and industrial mobilization. Case studies and analyses of the legislative framework within which government participation in the economic structure is set make up the background of the course.

2½ semester hours credit

G 206 MANAGERIAL CONTROL — ORGANIZATION

This course is concerned, at the top management level, with the legal and practical problems involved in the selection, establishment and operation of business organizations, including partnerships, corporations and business trusts. Among the topics considered are formation; charter powers and by-law provisions as the source of legal authority; records; duties; rights, responsibilities and liabilities of officers, directors, stockholders, partners and trustees; protection of minority interests; rights and remedies of creditors; consolidation, merger and dissolution; patents, trademarks and copyright. All of the foregoing are treated from the point of view of the advantages and disadvantages of each type of business organization.

2½ semester hours credit

G 209-210 MANAGERIAL CONTROL — FINANCE

A study of the methods of selection and development of the optimum financial structure for the business firm, including financial activation of the organization and efficient maintenance of its operation; sources of initial as well as of operating capital; costs of capital; dividend policy and dividend payment procedure; organization for finance, including capital budgeting, tax planning, long-range fiscal planning; financing for reorganization, merger, and liquidation; international aspects of financial control; analysis of financial statements and the significance of operating ratios.

5 semester hours credit
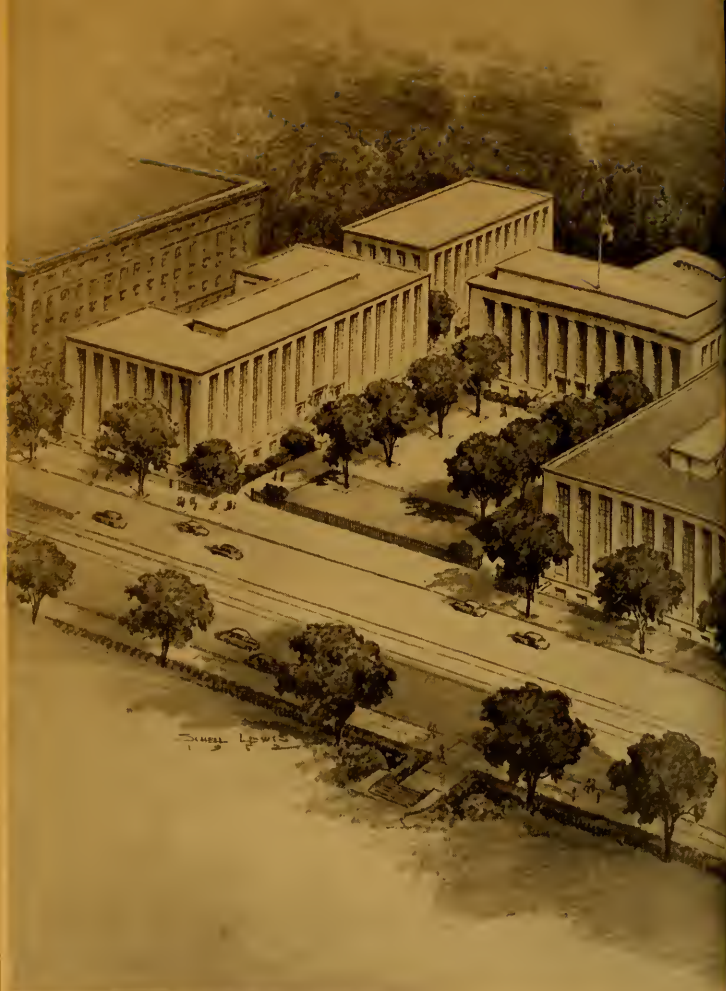
Northeastern University by the Architect

The facilities of Northeastern University are housed in the buildings shown above which in[...]ersity Library, Science Hall, Student Center Building, Alumni Auditorium, Richards Hall. Gymnasium and Indoor Athletic Field. Not included in the drawing are the B[...]ng and the Greenleaf Building, which house classrooms and laboratory facilities.

G 211-212 MANAGERIAL CONTROL — PRODUCTION

Top management consideration of the responsibilities and function in organizing for, planning, and controlling the procedures of production. The course considers the modern tendencies of industrial development, specifically integration, concentration, consolidation, specialization, standardization, and diversification. It includes a study of the consumptive demand to determine markets and what to manufacture; factors affecting the industrial site, such as accessibility to raw materials, adequate labor supply, transportation service and costs; plan and design, construction and layout for effective production flow; selection of equipment; the coordination of output with demand; seasonal production; production planning; inventory control; quality control; procurement; cost control; methods of compensation of labor.

5 semester hours credit

G 213-214 MANAGERIAL CONTROL — DISTRIBUTION

The subject matter in this course is considered from the policy-level problems of present-day distribution of merchandise. It combines the managerial control of the functions of market research, sales promotion, and sales management, and the coordination of these functions with production management and financial management. It includes problems of establishing sales objectives and sales policies, developing the sales organization; product analysis and planning; product packaging for marketing and shipping purposes; the relation of production to effective demand; the break-even point; sales forecasting and budgeting; pricing policies; marketing channels; selling methods; selling costs; policy of salesmen's compensation; sales quotas; sales-expense relationships; market studies, both domestic and foreign; problems and policies relative to government regulations or controls on distribution.

(*Prerequisite, D 111*)   *5 semester hours credit*

G 215 MANAGERIAL CONTROL — INDUSTRIAL RELATIONS

A study of managerial practice and policy relative to the recognition and solution of problems pertaining to employer-employee relations in industry; effective handling of controversial questions between management and the union, including contract negotiation, grievance procedure, and arbitration; communication between management, the union, and the rank and file; wage policies including job evaluation, incentives, income security benefit plans, and labor costs; labor productivity; the problems of government controls in industrial relations; and the responsibilities to society of management and labor in today's economy.

2½ semester hours credit

G 216 MANAGERIAL CONTROL — ACCOUNTING

This course is designed to integrate accounting and its function into the broad aspects of managerial plans and policies. The growth of our leading companies in size and complexity of organization and operation, the increased intervention of government in business for purposes of taxation and the regulation of many activities in the public interest, the public financing of business enterprises through wide distribution of their securities, and the growing role of organized labor as a factor in business planning and operation, have created problems which can be solved only by broadly trained executive personnel. The keystone to this broad training is a thorough understanding of the use of accounting principles and processes in present control and future planning.

The accounting aspects of management treat with the control of business through accounting media such as the budgeting of manufacturing, marketing, and administrative costs, the design of systems, and procedures for efficient operation, and forward planning to minimize taxes. Also discussed are the preparation and use of reports especially designed for credit purposes, for presentation to management, stockholders, bondholders, and organized labor.

5 semester hours credit

G 220 INDUSTRIAL ECONOMICS

This course has two basic purposes: (1) to aid the student to extend to economy the application of factual analyses in which he is proficient, and (2) to develop an attitude that will cause him to approach industrial problems with regard for their economic as well as their physical implications. Much emphasis is placed on the fact that the forerunner of industrial application is the aspect of feasibility.

The following topics are treated at considerable length: comparison of alternatives in business situations; financial calculations involving the time value of money, interest rates, repayment plans, equivalence, present worth, development of interest formulas and tables, capital recovery; machine or structure replacement studies; depreciation evaluation; break-even and minimum cost points, etc.

2½ semester hours credit

G 222 MANAGERIAL ECONOMICS

The purpose of this course is to show how economic analysis can be used in formulating business policies. It is an attempt to bridge the gap between the logic of economic theory and the problems of policy for practical management. The course stems from the conviction that the economic theory of the firm should be the core of work in business administration and that the procedures and methods of such specialized areas as marketing, production, and accounting should be related to the broad profit-making objective of business enterprise. In developing an economic approach to executive decisions, the course draws upon economic analysis for the concepts of demand, cost, profit, competition, etc., that are appropriate for the decision. Modern methods of econometrics and market research are employed to the extent and to the degree that they are necessary for getting estimates of the relevant concept.

2½ semester hours credit

G 230 MANAGERIAL CONTROL — QUALITY

A major consideration for effecting a successful quality control program lies in its administration. This course is pointed at bringing an appreciation of the non-technical aspects of administering a quality control program. In developing these concepts, intensive discussion is given to economics of quality; relation of design and inspection to control of quality; organizing for quality control; quality control engineering; integration of quality functions; methods of obtaining quality assurance; and case studies.

(Prerequisite, IM 13)   *2½ semester hours credit*

G 298-299   THESIS SEMINAR

This course affords opportunity for the student to pursue advanced study and investigation in the field of his major interest. It will combine the objectives and procedures of a seminar course with those of the thesis. In this way the thesis represents the product of exhaustive investigation of a substantial business or industrial problem related to the seminar field. Each student is

assigned to a seminar thesis section depending upon his choice of specialization, and the instructor becomes his thesis adviser. The course continues through both semesters with regular periodic meetings arranged at the mutual convenience of instructor and students. A degree candidate will register for this course not later than September of the academic year in which he desires to complete his degree requirements.

5 semester hours credit

Ec 112-113 BUSINESS FINANCE

A graduate level study of the basic financial principles and problems involved in the management of a business, including financial instruments, institutions, capital structure, refinancing, working capital, management, credit, reorganization and control. The course is specifically designed for MBA students whose undergraduate program included no courses in banking or finance.
(Foundation Course)   *2½ semester hours credit*

A 109-110 C.P.A. PROBLEMS

A complete review of the theories encountered in A 5, 6, 7, 8, 21, 22, 41, 42 This course is primarily for students intending to take the state C.P.A. examinations. Considerable practice is required, using largely problems from previous C.P.A. examinations. Emphasis is placed on the technique of adequate problem solutions.
(Prerequisites, A 7-8; 21-22; 25; 41-42; L 13, 14, 15)   10 semester hours credit

A 111 FUND ACCOUNTING

The concept of "fund" accounting finds its application in the accounting procedures of governmental units, charities, and educational institutions. This course deals with segregation of assets and liabilities into funds and self-balancing groups required by the organization of non-profit enterprises.

Integrated into the principles of funds is the treatment of accounting controls necessitated by governmental approaches or budgets.
(Prerequisite, A 6)   *2½ semester hours credit*

A 113-114 MANAGERIAL ACCOUNTING

A graduate level study of accounting in terms of its relations to management. The course presents the systematic aspects of the accounting method of collecting and reporting business information, and the problems associated with its collection, presentation, and analysis as a tool or aid to management. The emphasis, throughout the course, is on interpretation and meaning.

In general, the areas of study covered in the first half are double-entry procedure, the relation of accounting reports to the operations of the business, the analysis of business transactions, the classification and accumulation of accounting data and accounting reports, and their analysis. The second half deals with problems of depreciation, manufacturing costs, the elements of cost planning and control, and budgetary procedure. The course is specifically designed for graduate students whose undergraduate program included no courses in accounting.
(Foundation Course)   *5 semester hours credit*

A 137 BUDGET PROCEDURES

Budgetary control has received definite acceptance by businessmen as a highly useful and practical aid essential to sound business management. The

course considers the requisites to successful budgeting and the essential steps in budgetary control, with the procedures for carrying out budget policies. Various budgets are discussed and illustrated; sales, production, purchases, manufacturing expenses, administrative expenses, and financial; the preparation of estimated financial statements; comparison of the budget with performance at the end of the budget period, and analysis of the variances between actual and budget figures to determine causes.

(Prerequisite, A 7-8) *2½ semester hours credit*

A 134 CONTROLLERSHIP — THEORY AND PRACTICE

The three basic objectives of the controllership function are defined as control and protection of corporate property, compliance with legal reporting and record-keeping requirements, and assistance to management in controlling operations and formulating policies. Work of the controller is an advanced course in controllership, covering the functions and organization of the controller's department, basic techniques employed by the controller, the interpretation of historical results and their coordination into the broad policy-making program of the business. The technical phases of the controller's work are covered as preparation for the study of the controller's role as reporter, adviser, and counsellor to business management at all executive levels undertaken in the latter part of the course.

(Prerequisite, A 137) *2½ semester hours credit*

A 143-144 ADVANCED FEDERAL TAXES

This course is designed to prepare the student to handle the complicated tax problems arising in everyday business. To give the student experience in methods used in actual tax practice, he is required to study the provisions of the Internal Revenue Code, analyze numerous special tax problems, and solve them by applying relevant provisions of tax law. Solutions must be supported by citations.

(Prerequisite, A 41-42) *5 semester hours credit*

A 145-146 TAX PLANNING

An advanced course in corporate tax problems covering tax advantages and disadvantages of the corporate form of organization; dangers of inadequate capitalization; compensation problems, including deferred compensation, bonus plans, and pension plans; problems of close corporations; the section 102 penalty; corporate reorganization and liquidation; expense accounts of executives; research and development expenses; and cancellation of indebtedness. A detailed analysis of real estate tax problems, including tax aspects of mortgages, lease agreements containing options to buy, sales and lease pacts; also purchase and sale of a business, including covenants not to compete; survivorship purchase agreements; pointers on bad debts, worthlessness, and other business losses. Methods of effecting tax economies in connection with these problems will be stressed.   *5 semester hours credit*

D 107 PRINCIPLES OF MARKETING

This course deals with the techniques of research investigations in the collection and utilization of data relating to the problems of marketing, and securing profitable application of the results of market research in business; the facilities available for carrying out research activities; the development of the market research department; evaluating the practicability of undertaking specific market research studies; planning mail and field investigations; preparation of materials; testing results; interpretation of findings; prepara-

tion of reports leading to the development of new products, sales methods, and sales areas.

(Foundation Course)   2½ *semester hours credit*

Ec 107 STATISTICS FOR MANAGEMENT

This course, presented from the point of view of the business man, is concerned with the nature and calculation of averages; measures of dispersion; skewness, kurtosis, and normal curve analysis; an introduction to basic probability and its relationship to sampling; measurement of secular trends; seasonal and cyclical fluctuations; index numbers; and linear correlation.

(Foundation Course)   2½ *semester hours credit*

Ec 115-116 APPLIED SECURITY ANALYSIS

This course is designed to acquaint the student with methods used by practicing security analysts in their studies of various industries and to provide practical information useful in future analysis of companies operating in these industries. It includes review of basic principles of Security Analysis; tools used by practicing analysts; analytical study of various industries comprising our economy, including the major consumer goods, capital goods, service industries, public utilities, and railroads. Practicing analysts who are specialists in their respective industries will comprise the faculty. These instructors will develop the problems affecting their industries, the methods used in appraising their outlook, and the approaches to the problems of analyzing the securities of individual companies within these industries.

(Prerequisite, Ec 6)   5 *semester hours credit*

Ec 118 MONEY AND BANKING

This course includes a brief but comprehensive survey of the institutional aspects of the monetary system and the banking structure in the United States. Emphasis is placed on the essential relationships among commercial banks, Federal Reserve System, and Treasury. The process of credit expansion is analyzed in terms of its impact on aggregate economic activity; and prominent theoretical interpretations of monetary and credit problems are explained, discussed, and evaluated. Discussion of contemporary and historically significant monetary policies and fiscal measures from both the domestic and the international point of view occupies an important place in the course.

2½ *semester hours credit*

Ec 119 BUSINESS FLUCTUATIONS AND FORECASTING

This course is designed to present a review of the primary theories of continuing disequilibrium in a capitalistic economy, a brief survey of the statistical history of fluctuations in the level of economic activity, and a careful investigation into contemporary analyses of income and employment determinants. The rudiments of econometric model-building are introduced, and several aspects of forecasting (techniques and results) are assayed. Stabilization programs and policy questions are explained, debated, and evaluated.

(Prerequisite, Ec 118)   2½ *semester hours credit*

Ec 122 INTERNATIONAL ECONOMICS

This course attempts to analyze foreign trade and finance in terms of current practices and theories. It discusses national welfare and foreign trade; international accounting and what the balance reveals; the making of international payments and documents used; the rate of exchange; international equilibrium; foreign trade and the national income; principles behind

protection; trade control through the tariff, import quotas, exchange controls and their evaluation; international commodity agreements and commercial treaties; monetary policy problems; the international gold standard; exchange reserve standards; exchange stabilization funds; the shortage of dollars; the International Monetary Fund; international investments.

2½ semester hours credit

Ec 117 PUBLIC FINANCE

An examination of the techniques of raising, administering and spending funds by governmental bodies, on federal, state and local levels, including the objectives of government expenditures, the theories behind them, their economic effects, and various methods for their control; the administration of government expenditures as embodied in fiscal policies of government; the nature of public debt, its history, and management; methods of raising public funds, economic, legal, and ethical aspects of taxation and exemption from taxation; specific taxes as sources of government revenue; the federal-state-local fiscal interrelationships.

2½ semester hours credit

Ec 109-110 BUSINESS PLANNING AND RESEARCH

To examine the nature, organization, and operation of our present economic society as a producing mechanism; the flow of income arising out of this production, which determines the capacity of the people to purchase the goods and services produced annually, and to provide the savings essential to the formation of new capital. To develop and present an objective and comprehensive analysis of the information and statistics regarding our economic system which influence general business conditions and which furnish useful aids toward more definite and more accurate business decisions. To demonstrate the practical usableness of these data in actual business situations involving the management of production, marketing, and finance.

(Foundation Course) *5 semester hours credit*

IR 109 WAGE ADMINISTRATION

The course is a comprehensive study of the underlying theory of industrial wages. Specific consideration is given to job and salary analysis and evaluation; merit rating; incentive wages; wage payment plans. The importance of a sound wage structure to healthy employer-employee relations and the administration of wages through collective bargaining from the production as well as the labor relations point of view.

2½ semester hours credit

IR 111-112 PERSONNEL ADMINISTRATION — HUMAN RELATIONS

Effective handling of human problems has become a factor of vital importance to management. This course in human relations in business is the foundation to all personnel policy and offers an approach or understanding of value not only to those in personnel work but also to all persons having supervisory relationships. Subjects included for discussion are the techniques of approach to situation analysis; problems in selection; training; employee rating; change of employee status; supervision; wage policies; complaints and grievances; employee morale; labor turnover; discipline; health; safety; employee participation; collective bargaining; public relations.

5 semester hours credit

IR 123 LABOR LEGISLATION — UNION-MANAGEMENT RELATIONS

Government and Labor-Management Relations and the development of labor legislation. The purpose, policy and jurisdiction of the National Labor

Relations Act, as amended by the Taft-Hartley Act. A detailed study of the Labor-Management Relations Act, 1947 (Taft-Hartley Act). The Fair Labor Standards Act of 1938 (Wage and Hour Law) as amended by the Portal-to-Portal Act of 1947. Consideration of the procedures, powers and limitations of the agencies administering the statutes.

2½ semester hours credit

IR 125 THE LABOR AGREEMENT — NEGOTIATION AND ADMINISTRATION

The negotiation, re-negotiation, and administration of labor contracts; study of the component clauses such as union recognition and security, management prerogatives, seniority, vacations, wages, hours, working conditions; grievance analysis and arbitration procedure developed through case studies in actual labor-management relations as affected by such clauses, and the entire collective bargaining agreement and relationship.

2½ semester hours credit

IR 127 LABOR RELATIONS SEMINAR

Round-table discussion of current labor-management problems such as union responsibilities, management responsibilities, the annual wage, profit-sharing pensions, criteria for wage determination, contractual welfare programs, social legislation, etc. Cases will be considered raising specific issues for discussion.

(Foundation Course) *2½ semester hours credit*

IM 111 PRINCIPLES OF PRODUCTION PLANNING

A basic treatment of the planning principles applied to the development and operation of a manufacturing unit, including analysis of the product to be manufactured; market and sales research; plant location; plant design and determination of required physical facilities; the internal organization; the engineering organization for development of product; distribution and control of engineering information; establishment of manufacturing budgets for control; production planning, including inventory control policy, receiving and storeskeeping, procurement; plant layout; and managerial controls to appraise manufacturing performance.

(Foundation Course) *2½ semester hours credit*

IM 114 ADVANCED QUALITY CONTROL

This course is designed primarily for those who require a more detailed understanding of the application of quality control techniques. The material covered in Quality Control is enlarged on and a number of the more recently developed techniques are treated in detail. Application of the methods to several particular industries, such as metal-working, textile, aircraft, chemical process, electron tube, screw machine products, is studied.

Subjects covered are special purpose control charts; multi-vari charts; rational sub-grouping principles; pictograms; PD-diagrams; principles of visual inspectors; establishing quality assurance; check inspection methods; special trouble-shooting techniques; organizing a quality control program and introducing it into the factory. Each student conducts a term project involving application of the methods in his own field.

(Prerequisite, IM 13 or equivalent) *2½ semester hours credit*

IM 119-120 PLANT LAYOUT

This course is taught on a combination lecture and laboratory method using the latest techniques and equipment employed in industrial practice. Instruc-

tion proceeds principally by the project method where a plant site is chosen for the manufacture of a specific product. The product is analyzed to determine the processes involved, the number and types of machines and auxiliary equipment necessary for manufacture. Flow charts are prepared and machine and equipment location determined using A.S.M.E. approved two-dimensional and three-dimensional scale models.

In addition to the physical arrangement of machines and equipment, consideration is given to the layout of utilities such as power, light, water, sprinklers, drainage, telephones, heating equipment, lavatories, etc. Alternate layouts are considered and all cost factors including estimates of construction changes are evaluated to determine most economical layout. Detailed attention is given to the layout of office areas and departments servicing production as well as areas designed for employee safety and convenience. Design is checked for conformance to local and state regulations pertaining to building codes, zoning, safety, and fire protection. Finished layout drawings are prepared for presentation to management.

(*Prerequisites*, IM 1, IM 12, IM 15-16)   *5 semester hours credit*

IM 122 INDUSTRIAL EXPERIMENTATION

The two main problems confronting experimenters in the laboratory, pilot plants, and at factory levels are the evaluation of data and the design of experiments. They are essential tools of the engineer and factory trouble-shooter. Consequently, this course dealing with tests of significance, analysis of variance, correlation techniques, and experimental design is specifically directed at producing greater efficiency and competency for quality control personnel as well as experimenters of all classes.

The section on testing the significance of averages, variances, percentages is concerned with the "u", "t", "F", "L", "J", and Chi-Square statistical tests. The course continues with process trouble-shooting methods of graphical analysis and experiment design; specific experiment designs and analysis of variance for single, double, multiple factor tests; Latin Square and Graeco-Latin Square, Incomplete Latin Square and Youdon Square design; importance of balancing and randomizing; pictograms for summarizing results of experiments. The correlation techniques to be considered are the simple linear, tetrachoric, rank and multiple correlations.

The person completing the course will be equipped not only to select an efficient design for his experimental work, but will also be enabled to make an objective evaluation of the data to determine whether the variations in the data are significantly different from those which might be expected purely on a chance basis. It is important to note that the ability to make this kind of distinction helps avoid experimental blind alleys, with the associated vital savings in dollars and days.

2½ semester hours credit

L 113 BUSINESS LAW I

A graduate level study of contracts, including the nature, kinds and formation of contracts; breach, remedies and damages. Agency: nature, purpose and formation of agency relationship; rights and duties of principal and agent, scope of agent's authority; rights and duties of principal and third persons; termination of agency. Employer and employee: compensation laws; duties of master; contributory negligence doctrine; injuries to third

persons. This course is specifically designed for MBA students whose undergraduate program included no courses in business law.
(*Foundation Course*)   *2½ semester hours credit*

L 114   BUSINESS LAW II

A graduate level study of negotiable instruments; bills, notes and checks; requirements of a negotiable instrument; negotiation; liabilities and defense of parties; procedure upon dishonor; discharge. Bailments: nature and kinds; rights and duties of parties; carriers; documents of title. Sales: nature of sales contracts; warranties; transfer of title; rights and remedies of seller and buyer. Insurance: formation and function of insurance contract; kinds of policies; legal phases of life, property and other insurance. Suretyship: rights of the surety and the guarantor; rights and duties of the creditor; defenses of the surety and guarantor. This course is specifically designed for MBA students whose undergraduate program included no courses in law.
(*Foundation Course*)   *2½ semester hours credit*

L 115   BUSINESS LAW III

A graduate level study of partnerships: nature, kinds and formation; rights and duties of partners; partner's authority to bind firm; relation of partners and third persons; dissolution and winding up. Corporations: nature and creation; charter; powers, rights and liabilities; nature and kinds of capital stock; rights and liabilities of stockholders; directors and officers. Mortgages: rights and duties of mortgagor; rights and duties of mortgagee; rights after default. Property: landlord and tenant relationship; classification of tenancies; rights and duties of landlord; rights and liabilities of tenant. Bankruptcy: Federal Bankruptcy Act; acts of bankruptcy; adjudication; rights and duties of bankrupt; unsecured, secured and priority claims; extensions, compositions, and other debtor-relief provisions; discharge. This course is specifically designed for MBA students whose undergraduate program included no courses in business law.   *2½ semester hours credit*

T 101 TRANSPORTATION PRACTICES

This course discusses the position of transportation as a tool in the hands of top-level management as well as a product of the carriers that make up the transportation system of the nation. The course content includes the importance of transportation in the American economy; a comparative evaluation of currently available transportation services based on cost, time in transit, reliability and geographical coverage including movement of freight by rail, motor, water and air carriers, freight forwarders, parcel post and express as well as combinations and modifications of each; classification of freight and rules of classification; basic studies in rates and tariffs; freight claims, transportation insurance and warehousing. The course formulates transportation cost control policies on the management level and provides practical training on the operational level.   *2½ semester hours credit*

T 111 MOTOR CARRIER OPERATIONS AND MANAGEMENT

This course deals with the management level problems and policy-making activities in motor transportation. The content includes the nature and growth of the motor carrier industry; a detailed analysis of the types of motor carriers — common, contract and private; government regulation under the Motor Carrier Act of 1935; operations, including over-the-road, local pickup and delivery, and terminal; equipment selection, financing, maintenance, and replacement; capital structure of the firm, as well as internal organization and

administration; labor relations and personnel administration; safety and insurance; freight loss and damage claims; accounting, taxation and cost allocation; tariffs and classification; sales and public relations; trade associations and carrier rate conferences. *2½ semester hours credit*

T 105-106 I.C.C. PRACTICES AND PROCEDURES

A course designed to acquaint management levels in the transportation industry and in the industrial traffic departments of general industry with the responsibilities applicable to the regulation of transportation by the Federal Government; who must execute these responsibilities; the procedure by which they are carried out; history and content of Interstate Commerce Act and its impact upon all industrial activity; purpose and function of the Interstate Commerce Commission; training and preparation for the Interstate Commerce Commission Practitioners' Examination, including a study of important cases under the Commerce Clause of the Constitution; administrative law and procedure; ethics and general rules of practice.

(Prerequisite, T 1, T 3) *5 semester hours credit*

T 117 ADVANCED TRANSPORTATION ECONOMICS

This course looks beyond the mechanics of traffic management toward the more complete professionalization of the transportation executive, including the part played by transportation in the production process and the marketing process; transportation and the division of labor; the effect of transportation rates on prices and on the location of industry; carrier rate structure; the philosophy of public utility regulation; lawfulness and unlawfulness of carrier rates.

2½ semester hours credit

Colleges and Universities Comprising Student Body

Alabama, University of
American University of Beirut
Babson Institute
Bates College
Boston College
Boston University
Brown University
Carnegie Institute of Technology
Catholic University (Washington)
Clark University
Clarkson College
Columbia University
Cornell University
Eastern Nazarene College
Georgia Institute of Technology
Harvard University
Illinois, University of
Indiana University
London, University of
Louisville, University of
Lowell Textile Institute
Maine, University of
Manhattan College
Massachusetts Institute of Technology
Massachusetts, University of
Michigan, University of
New Hampshire, University of
New York University
Northeastern University
Northwestern University
Oslo, University of
Pittsburgh, University of
Princeton University
Purdue University
Queen's College
Rensselaer Polytechnic Institute
St. Procopius College
Simmons College
Suffolk University
Trinity College
Tri-State College
Tufts College
Vermont, University of
Vienna, University of
Villanova College
Wisconsin, University of
Worcester Polytechnic Institute

Application
Received by_____

Date_____

Northeastern University
SCHOOL OF BUSINESS

360 HUNTINGTON AVENUE, BOSTON 15, MASS.

•

A fee of ten dollars must accompany this application. Make checks, money orders, or drafts payable to Northeastern University. **This fee is not refundable.** This fee is included under the educational benefits of the G. I. Bill of Rights.

APPLICATION FOR ADMISSION TO GRADUATE STUDY

Date..........

Mr.
Mrs.
I, Miss.......... ....
            First   Middle   Last Name

submit the following information for review by the Committee on Admissions.

If my qualifications are satisfactory I wish to attend as:

☐ A Candidate for the degree of Master of Business Administration.

☐ A Special Student registering for the following courses:

Home Address.......... .... Tel..........
            Street   City   State

Date of Birth.......... Do you plan to attend under the G. I. Bill? Yes ☐   No ☐

Supply full information regarding previous collegiate education.

	COLLEGE OR UNIVERSITY	LOCATION	DATES ATTENDED	DEGREE	DATE OF GRADUATION	HONORS
Undergraduate Study						
Graduate Study						

OVER →

I request advanced standing credit for graduate study completed at . . . . for which I shall furnish a transcript.

As one of the requirements for admission, I shall procure letters of recommendation as to my qualifications for graduate study from the following persons:

(1) Educational Reference: Name. . . . . Title. . . . .
        Officer of college, preferably head of department in which you received bachelor's degree.

(2) Employment Reference: Name. . . . . Title. . . . .
        Officer of company by which you are presently employed.

. . . . Tel. No. . . . .
    Company   Address

(3) Personal Reference: . . . .
                            Name   Address

Résumé of employment during the past ten years (including military service):

Name and Address of Employer	Title of Position	Nature of Work	Dates From	To

. . . .
                    Signature of Applicant

Upon receipt of all the necessary credentials, your application will be reviewed by the Committee on Admissions and you will be notified of its action.

NORTHEASTERN UNIVERSITY

COEDUCATIONAL

Programs of instruction leading to appropriate degrees are offered by the Schools and Colleges of the University in the following areas of study:

LIBERAL ARTS

The COLLEGE OF LIBERAL ARTS offers a broad program of courses in the sciences, mathematics, modern languages, humanities, and social studies serving as a foundation for the understanding of modern culture, social relations, and technical achievement. Varied opportunities are available for specialization. Degrees: Bachelor of Arts or Bachelor of Science.

The EVENING DIVISION of the College offers courses in arts and social sciences during evening and Saturday morning hours. Degrees: Bachelor of Arts; Associate in Arts.

EDUCATION

The COLLEGE OF EDUCATION offers day curricula combining broad general education and professional study for the preparation of elementary and secondary school teachers. Degree: Bachelor of Science in Education.

The GRADUATE DIVISION of the College offers, during late afternoon, evening and Saturday morning hours, advanced courses leading to the degree of Master of Education.

BUSINESS

The COLLEGE OF BUSINESS ADMINISTRATION offers curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management. Each curriculum represents in itself a broad survey of business technique, differing from the others chiefly in emphasis. Degree: Bachelor of Science in Business Administration.

The SCHOOL OF BUSINESS, organized specifically to meet through evening classes the needs of employed persons, offers curricula in Accounting, Business Management, Engineering and Management, Industrial Management, Insurance, Marketing, Law and Business, Personnel and Industrial Relations, Real Estate, Retailing, Public Administration, Transportation and Traffic Management. Degrees: Bachelor of Business Administration; Associate in Business Administration.

THE GRADUATE DIVISION of the School provides an evening program of advanced study leading to the degree of Master of Business Administration.

ENGINEERING

The COLLEGE OF ENGINEERING offers professional curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. Degree: Bachelor of Science in Engineering with specification as to field.

The GRADUATE DIVISION of the College offers, during evening hours, advanced courses in certain fields of Civil, Mechanical, and Electrical Engineering, Chemistry, and Mathematics-Physics, leading to the degree of Master of Science.

The LINCOLN INSTITUTE offers four-year evening programs in the technology of various fields of engineering and in chemistry. The curricula comprise courses of college grade which are integrated into programs covering the several specialized fields. Degrees: Associate in Engineering; Associate in Chemistry.

The Cooperative Plan

The Colleges of Liberal Arts, Education, Business Administration, and Engineering offer day programs and are conducted on the Co-operative Plan. After the freshman year students alternate periods of study with periods of work in the employ of business or industrial concerns. Under this plan they gain valuable experience and earn a large part of their college expenses.

For further information regarding any of the above schools, address

Director of Admissions

NORTHEASTERN UNIVERSITY

BOSTON, MASSACHUSETTS

COpley 7-6600   360 Huntington Avenue

NORTHEASTERN UNIVERSITY

College of Education

GRADUATE
DIVISION
BULLETIN

Calendar

Summer Term, 1954
Registration, July 6, 1954
Classes Begin July 7, end August 13

Fall Term, 1954-55
Registration period, September 6-18
Classes Begin Week of September 13

Spring Term, 1954-55
Registration period, January 24–February 5
Classes Begin Week of January 31
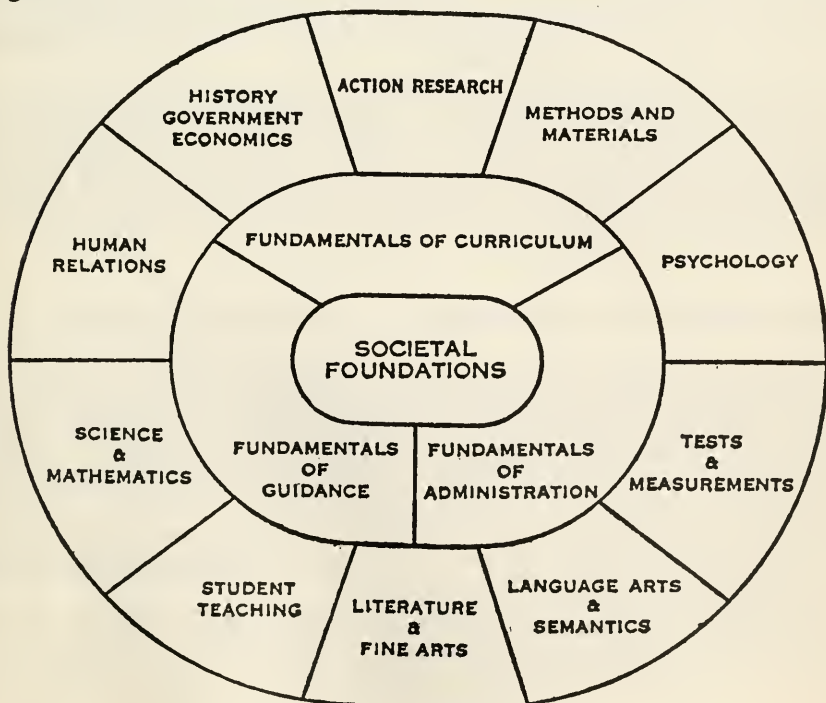
The Graduate Program in Education

ITS PURPOSES

It seems increasingly evident that programs of professional study must be appraised continuously in the light of the characteristics of the current world, the requirements of modern American communities, the nature of the students in the schools, and the sharply refined understandings and skills which teachers need. The graduate program in the College of Education at Northeastern is based upon these important considerations, defined from the experiences of many teachers and administrators.

Opportunities for study are provided over a wide range of fields so that teachers may deepen their knowledge of subject matter, broaden their understanding of educational problems, and develop increasing professional competence.

THE DESIGN OF THE PROGRAM

Attempts have been made to organize the graduate program with two principles in mind — unity and flexibility. The principle of unity operates in the selection of a meaningful sequence of courses with a particular professional goal in mind. The principle of flexibility functions in the light of a person's previous experience and education. It is obvious that both will function simultaneously.

The chart suggests the relationships available among the many aspects of the program.

DESIGN FOR GRADUATE PROGRAM

The College has defined four categories of formal study.

1. The Societal Foundations course integrates the disciplines of anthropology, sociology, and psychology in the study of the individual and the group.

2. The three professional cores, Fundamentals of Curriculum (Elementary or Secondary), Fundamentals of Guidance, and Fundamentals of Administration function as a modified major with no prerequisites, but giving the student many of the basic aspects that belong together in the study of these fields.

3. Teachers and supervisors often desire work in specialized segments of the school program, such as The Teaching of Reading, Language Arts, Social Studies, and Science. These include both methods and materials.

4. Also available are a number of specially organized subject matter courses of a cultural nature as well as many now offered in the graduate programs of the other colleges of Northeastern University.

Announcements of course offerings during any of the three Academic Terms are available upon request prior to the beginning of the terms.

PLAN OF GRADUATE STUDY

The College of Education offers opportunity to study on either a part-time or full-time basis. Since courses are offered late afternoons, evenings, and Saturday mornings, as well as during summer sessions, it is possible for those now teaching to complete course requirements for the master's degree in two years or less. For those interested in full-time study, course requirements could be completed in about a twelve-month period.

Students who desire to matriculate in selected courses will be classified as special students. Those who have attained a baccalaureate degree from an accredited institution and who have enrolled in any graduate course will be designated as regular students. Those who have expressed their desire to attain the master's degree and who have successfully completed a minimum of twelve hours will be classified as master's candidates.

REQUIREMENTS FOR ADMISSION TO GRADUATE COURSES

The courses in the Graduate Division are designed for persons who already hold a bachelor's degree from an accredited institution. Persons who do not hold a bachelor's degree, but who are otherwise qualified by reason of their training and experience to profit from the instruction given, will also be permitted to enroll as special students. Those wishing to transfer from graduate programs elsewhere may do so. Up to six semester hours can be transferred, with an additional six hours possible upon careful evaluation. Other persons desiring to complete requirements for the baccalaureate degree will find a wide selection of course offerings in the Evening Division of the University.

Students should meet with the Dean or a member of the staff to assure the scheduling of a mutually satisfactory program.

DEGREE REQUIREMENTS

Those desiring to obtain the degree of Master of Education must submit the following for consideration:

1. A total of 30 semester hours with grades of B or better, not more than half of which will be in Professional Education, not including Foundations. Exception may be made for those with little or no previous professional study.

2. An acceptable action research project carried out in the candidate's classroom, school or community.

    College graduates who desire to meet certification standards in the several states will receive special consideration. Supervised student teaching without credit can be substituted for the action research project while the student completes other basic requirements.

3. Evidence of possessing a unified and functional philosophy of education based on careful thought, study, and research, and the ability to communicate this to others.

TUITION

Tuition fees are based on a charge of $16 a semester hour, payable at the beginning of each semester.

Occasionally situations develop, beyond the control of the student, which make it difficult to meet the payments in the manner outlined above. Under such circumstances the student is advised to discuss his problem personally with the Student Accounts Office where a deferred payment agreement may be worked out. Such arrangements should be made before the end of the first week of the semester or within one week of the date of registration if the student enters late.

REFUND OF TUITION

Under normal circumstances no refund of tuition is granted to a student for partial or full withdrawal from the program. Under certain conditions, however, which are beyond the student's control, special arrangements for refund of tuition may be made with the Dean of the College of Education.

MATRICULATION FEE

The University matriculation fee of $10 must accompany the initial application for admission to the University. This fee is nonrefundable.

LATE PAYMENT FEE

Bills for tuition and fees are payable on or before Saturday of the week of issuance. A late payment fee of $2 is charged for all students failing to comply unless special payment arrangements have been previously approved by the Student Accounts Office.

LATE REGISTRATION

Students are urged to register well in advance of the opening of the semester, since any student who registers after the first week of classes of the school term is charged a late registration fee of $5.

WITHDRAWAL OF COURSES

The University reserves the right to withdraw any course in the event of insufficient enrollment.

VETERANS

Veterans planning to register should contact the Veterans Office, Room 250, Richards Hall, as early as possible.

COURSES IN OTHER DEPARTMENTS OF THE UNIVERSITY

College of Education students assigned to courses in other departments of the University are charged the tuition rates and other fees effective in the departments to which they are assigned.

FOR FURTHER INFORMATION

Anyone desiring additional information may write to the Dean of the College of Education, Northeastern University, Huntington Avenue, Boston 15, Massachusetts, or come directly to Room 151, Richards Hall.

Northeastern University

(COEDUCATIONAL)

COLLEGE OF EDUCATION

Offers curricula on the full-time study plan in Elementary Education, English, General Business, Mathematics, Modern Languages, Science, Secretarial Studies, and Social Studies. Programs in Teacher Education include practice teaching under supervision, and lead to the Bachelor of Science in Education degree. Offers also late afternoon, evening, and Saturday morning graduate level courses in Administration, Guidance, Societal Foundations, and subject matter fields leading to the degree of Master of Education.

*COLLEGE OF LIBERAL ARTS

Offers a broad program of subjects serving as a foundation for the understanding of modern culture, social relations, and technical achievement. Varied opportunities are available for vocational specialization. Degree: Bachelor of Science or Bachelor of Arts.

*COLLEGE OF ENGINEERING

Offers curricula in Civil, Mechanical, Electrical, Chemical, and Industrial Engineering. Classroom study is supplemented by experiment and research in well-equipped laboratories. Degree: Bachelor of Science in the professional field of specialization.

The College of Engineering also offers during evening hours graduate programs of instruction leading to the degree of Master of Science in certain fields of civil, mechanical, and electrical engineering, chemistry, and mathematics-physics.

*COLLEGE OF BUSINESS ADMINISTRATION

Offers curricula in Accounting, Industrial Relations, Marketing and Advertising, Finance and Insurance, and Business Management. Each curriculum represents in itself a broad survey of business technique, differing from the others chiefly in emphasis. Degree: Bachelor of Science in Business Administration.

SCHOOL OF BUSINESS

Offers curricula through evening classes in Accounting, Management, Marketing, Law and Business, Engineering and Management, and Public Administration. Conducts certificate programs in Labor Relations, Retailing, Real Estate, Office Management, Insurance, Transportation and Traffic Management, Credit and Financial Management, Municipal Management, Production Management, Quality Control, World Trade, and for Business and Professional Secretaries. Arranges intensive programs of one or more courses to serve special needs. Degree: Bachelor of Business Administration with appropriate specification.

The Graduate Division of the School of Business provides an evening program of graduate study leading to the degree of Master of Business Administration.

EVENING DIVISION OF THE COLLEGE OF LIBERAL ARTS

Offers courses in the fields of Economics, English, History, Government, Philosophy, Psychology, and Sociology; and prepares for the study of law and further study in Liberal Arts; special courses may be arranged. Degrees: Bachelor of Arts, Associate in Arts and Associate in Science.

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*The Co-operative Plan

The Colleges of Liberal Arts, Engineering, and Business Administration offer day programs and are conducted on the Co-operative Plan. After the freshman year, students alternate periods of study with periods of work in the employ of business or industrial concerns. Under this plan they gain valuable experience and earn a large part of their college expenses. Full-time curricula are available for preprofessional students who do not desire the Co-operative Plan.